

66TH CONGRESS
2d Session

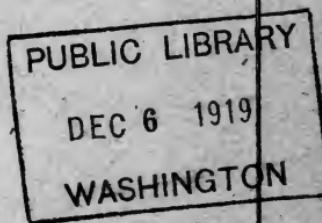
HOUSE OF REPRESENTATIVES

{ DOCUMENT
No. 423

ANNUAL REPORT OF THE
COMMISSIONERS OF THE
DISTRICT OF COLUMBIA
YEAR ENDED JUNE 30, 1919

Vol. II

ENGINEER DEPARTMENT
REPORTS



WASHINGTON
1919



66TH CONGRESS
2d Session }

HOUSE OF REPRESENTATIVES

{ DOCUMENT
No. 423

ANNUAL REPORT OF THE
COMMISSIONERS OF THE
DISTRICT OF COLUMBIA
YEAR ENDED JUNE 30, 1919

Vol. II

ENGINEER DEPARTMENT
REPORTS



WASHINGTON
1919

1887

TABLE OF CONTENTS.

	Page.
Ashes, collection of-----	36
Asphalt and cements, report of inspector-----	42
Asphalt, sheet, specifications for-----	183
Assistants to Engineer Commissioner, reports of-----	25, 54
Besson, Capt. F. S., report of-----	25
Boilers, steam, report of inspector-----	159
Bridges, report of engineer-----	31
Brown, Capt. Carey H-----	54
Buildings, report of inspector-----	157
Cement concrete roadways, specifications for-----	192
Chief clerk, report-----	178
Constructing engineer at the District of Columbia Workhouse and Reformatory, report of-----	128
District Building, report of superintendent-----	189
Electrical engineer, report of-----	164
Engineer Commissioner, report of-----	25
Extract from Report of the Commissioners of the District of Columbia for the fiscal year ended June 30, 1919-----	5
Highways, report of engineer-----	25
Insanitary buildings, report of board for condemnation of-----	181
Municipal architect, report of-----	116
Municipal garage, report of superintendent-----	53
Parking, report of superintendent of trees and-----	48
Permit clerk, report of-----	163
Plumbing board, report of-----	162
Plumbing inspector, report of-----	160
Refuse, miscellaneous, collection of-----	36
Repairs, report of superintendent of-----	122
Roads, suburban, report of superintendent-----	30
Sanitary engineer, report of-----	82
Sheet-asphalt pavements, specifications for-----	183
Stables, Engineer Department, report of superintendent of-----	33
Steam engineers, report of board of examiners-----	159
Street cleaning and city refuse, report of supervisor of-----	36
Street-extension division, report of-----	44
Streets, report of superintendent-----	30
Surveyor, report of-----	43
Trees and parking, report of superintendent-----	48
Water department, report of superintendent-----	54
Water registrar, report of-----	78
Wharf committee, report of-----	178

ORGANIZATION OF THE ENGINEER DEPARTMENT, DISTRICT OF COLUMBIA.

Lieut. Col. CHARLES W. KUTZ, *Corps of Engineers, United States Army, Engineer Commissioner.*

Capt. F. S. BESSON, *Corps of Engineers, United States Army, Assistant.*

Capt. CAREY H. BROWN, *Corps of Engineers, United States Army, Assistant.*

UNDER THE IMMEDIATE SUPERVISION OF THE ENGINEER COMMISSIONER.

RECORD DIVISION :

DANIEL E. GARGES, *Chief Clerk.*

WILARF COMMITTEE:

DANIEL E. GARGES, *Chief Clerk, Engineer Department.*

D. E. McCOMB, *Engineer of Bridges.*

RUSSELL DEAN, *Harbor Master.*

DISTRICT BUILDING :

Capt. F. S. BESSON, *Superintendent.*

UNDER THE IMMEDIATE SUPERVISION OF CAPT. BESSON.

HIGHWAYS (STREETS, ROADS, BRIDGES, ETC.) :

C. B. HUNT, *Engineer of Highways.*

J. W. DARE, *Assistant Engineer of Highways.*

Sidewalks and alleys—

H. N. MOSS, *Superintendent of Streets.*

Construction and maintenance of suburban roads—

L. R. GRABILL, *Superintendent of Suburban Roads.*

Construction and care of bridges—

D. E. McCOMB, *Engineer of Bridges.*

Engineer Department Stable—

BART. J. LYNCH, *Superintendent.*

STREET AND ALLEY CLEANING, COLLECTION OF GARBAGE, ETC. :

MORRIS HACKER, *Supervisor of City Refuse.*

T. L. COSTIGAN, *Superintendent of Street Cleaning.*

ASPHALTS AND CEMENTS :

J. O. HARGROVE, *Inspector of Asphalts and Cements.*

SURVEYOR'S OFFICE (including street extensions) :

M. C. HAZEN, *Surveyor.*

TREES AND PARKINGS :

CLIFFORD LANHAM, *Superintendent of Trees and Parkings.*

MUNICIPAL GARAGE :

E. P. BROOKE, *In charge.*

A. E. REIGLEMAN, *Superintendent.*

UNDER THE IMMEDIATE SUPERVISION OF CAPT. BROWN.

WATER DEPARTMENT :

J. S. GARLAND, *Superintendent.*

Water rates—

G. W. WALLACE, *Water Registrar and Chief Clerk.*

SEWER CONSTRUCTION AND MAINTENANCE :

ASA E. PHILLIPS, *Sanitary Engineer.*

MUNICIPAL ARCHITECT :

SNOWDEN ASHFORD.

Repairs to municipal buildings—

HENRY STOREY, *Superintendent of Repairs.*

BUILDING INSPECTION :

JOHN P. HEALY, *Inspector of Buildings.*

Plumbing plans and inspection—

A. R. McGONEGAL, *Inspector of Plumbing.*

Permits, Engineer Department—

H. M. WOODWARD, *Permit Clerk.*

Plumbing board—

P. C. SCHAEFER.

J. S. O'HAGAN.

SAMUEL TAPP.

Board of examiners of steam engineers—

E. F. VERMILLION.

H. BOESCH.

W. L. EVANS.

ELECTRICAL DEPARTMENT.

WARREN B. HADLEY, *Electrical Engineer.*

BOARD FOR CONDEMNATION OF INSANITARY BUILDINGS :

Capt. CAREY H. BROWN, *Assistant to Engineer Commissioner.*

Dr. W. C. FOWLER, *Health Officer.*

JOHN P. HEALY, *Inspector of Buildings.*

EXTRACT FROM REPORT OF THE COMMISSIONERS OF THE DISTRICT OF COLUMBIA FOR THE FISCAL YEAR ENDED JUNE 30, 1919.

**OFFICE OF THE COMMISSIONERS
OF THE DISTRICT OF COLUMBIA,
Washington, October 1, 1919.**

To the Senate and House of Representatives of the United States of America in Congress assembled:

The Commissioners of the District of Columbia herewith submit for the information of Congress, pursuant to the requirements of section 12 of an act providing a permanent form of government for the District of Columbia, approved June 11, 1878 (20 U. S. Stats., 108), a report of the official doings of that government for the fiscal year ended June 30, 1919.

* * * * *

ROADWAY PAVEMENTS.

The accompanying table shows the area, in square yards, of new roadway pavements laid and old roadway pavements resurfaced during the year, with the totals in square yards and miles of the various kinds of pavements at the close of the fiscal year.

Comparative statement showing character and extent of roadway pavements.

	Existing amount June 30, 1918.		New pavement laid during the year (square yards).	Replaced with asphalt.	Existing amount June 30, 1919.	
	Square yards.	Miles.			Square yards.	Miles.
Sheet asphalt and coal tar.....	3,157,757	167.78	46,604	—	3,204,361	170.10
Asphalt block.....	626,222	31.75	5,546	1,132	630,636	32.05
Durax block.....	12,294	.30	—	—	12,294	.30
Asphaltic or bituminous concrete:						
On concrete base.....	78,708	4.58	—	—	78,708	4.58
On broken-stone base.....	51,088	2.68	—	—	51,088	2.68
Cement concrete.....	116,230	6.71	52,343	334	168,239	8.99
Granite block and rubble.....	406,035	22.03	—	14,104	391,931	21.44
Vitrified block.....	17,390	1.04	—	—	17,390	1.04
Cobble.....	62,336	3.01	—	201	62,135	3.00
Macadam (estimated).....	1,942,907	123.76	34,320	1,46,103	1,931,124	124.05
Gravel and unimproved.....	—	153.49	—	—	—	151.28
Gutters and asphalt streets.....	226,161	—	2,875	—	229,036	—
Gutters on asphaltic concrete.....	11,201	—	—	—	11,201	—
Pavements maintained by street railways.....	563,313	—	1,212	—	564,525	—
Total.....	7,271,642	517.13	142,900	61,874	7,352,668	519.51

¹ Includes 19,196 square yards of concrete pavement.

NOTE.—9,381.29 square yards sheet-asphalt and coal-tar pavements replaced, including 2,924.42 square yards asphalt surface on old base.

The sums appropriated for expenditures during the year under this head were as follows:

For paving new roadways and repairing old roadway pavements	\$750,600
For construction and repair of suburban roads	274,300
For grading streets, alleys, and roads	25,600

The dominating characteristic of the year's work in its first half was scarcity of labor and material, which was so pronounced that only construction work of a character essential to the conduct of the war was undertaken. Maintenance of streets and roads was emphasized, but no construction contracts, except for approaches to Government buildings, were made until the spring of 1919. At that time the year's construction was placed under contract except the construction of suburban roads. All street construction appropriations due to this enforced postponement of their expenditure were reappropriated as to their unexpended balance for the fiscal year 1920. It is believed that under contracts now made or under advertisement this entire construction program will be practically completed during the present working season, the asphalt portion by September.

The day labor activities were conducted under extreme difficulties and at high costs. The former conditions were ameliorated to a marked extent during the present working season, but the latter show no reaction.

The prices paid under contract for roadway pavements during the year were as follows:

	Per square yard.
Laying sheet-asphalt pavement (2½-inch asphalt surface, 2-inch binder, before compression) with 6-inch concrete base	\$3.00
Laying vitrified block with 6-inch concrete base	3.40
Laying sheet-asphalt pavement (2½-inch asphalt surface, 2-inch binder, before compression) with 5-inch concrete base	2.80
Laying vitrified block with 5-inch concrete base	3.26
Laying 6-inch concrete roadway	1.94

The prices paid for resurfacing and repairing asphalt pavements under a one-year contract which expired June 30, 1919, are as follows:

	Per square yard.
Laying sheet-asphalt pavement (2½-inch asphalt surface, 2-inch binder, before compression), with 6-inch concrete base	\$2.89
Laying sheet-asphalt surface (2½ inches before compression)	1.09
Laying asphalt binder (in connection with resurfacing work), per cubic foot	.43
Laying sheet-asphalt surface for repairs, etc., within the space required by law to be kept in repair by street railway companies, per cubic foot	.75
Laying asphalt binder for repairs, etc., within the space required by law to be kept in repair by street railway companies, per cubic foot	.60

SUBURBAN STREETS AND ROADS.

The total of the appropriations for the construction of suburban roads and streets for the year was \$275,800.

Concrete roadways appropriated for in 1918 but not completed, and those appropriated for 1919, about 35 streets in all, were placed under contract in the latter part of the year and are progressing toward completion. Massachusetts Avenue and Rhode Island Avenue were macadamized to the District line, and at the close of

the year the macadamizing of Sixteenth Street to Alaska Avenue was approaching completion under contract. A number of heavy grading contracts on various suburban streets were executed. Repairs to suburban roads were most inadequately carried out, the funds provided being entirely insufficient to cover the necessary field of work at the greatly increased cost of labor and material over those of former years.

MUNICIPAL ASPHALT PLANT.

The District of Columbia has operated a portable municipal plant in the repair of asphalt pavements and macadam streets for the past eight years. During the year 1919 the plant was operated for a period of 240 days, with a total output of 169,392 cubic feet of material, or an average of 706 cubic feet daily. This was a decrease from the daily output for the fiscal year 1918 of 163 cubic feet. Additional asphalt material for street repairs, supplemental to that furnished from the asphalt plant, was purchased under contract from the Cranford Paving Co. to the amount of 41,697 cubic feet, the total repair material placed on the streets from both sources during the year being 211,089 cubic feet, or 25,137 cubic feet in excess of that used in 1918, heavy traffic and the desire to thoroughly maintain these surfaces requiring this procedure. Old material was used to a great extent in the manufacture of the output. Old asphalt topping removed from the streets in resurfacing is crushed into a finely broken product, to which new material is added. All details of the cost of operation of the plant are contained in the report of the engineer of highways. The cost of the product laid on the streets is as follows:

Old material mixture, per cubic foot	\$0. 6265
Asphaltic concrete mixture, per cubic foot	.7436
Topping mixture, per cubic foot	.7463

The total cost of minor repairs to sheet-asphalt pavements during the year, representing the maintenance cost for the year, was \$97,068.13. This cost represents the maintenance of all asphalt streets not under guaranty by contractors—a total yardage of 3,157,757. The cost per square yard per year was about 3.07 cents. The like annual cost for previous years was as follows:

Cents.		Cents.
1908	3.8	1.9
1909	2.3	1.9
1910	2.6	1.8
1911	2.2	1.5
1912	2.4	1.7
1913	2.0	

The municipal asphalt plant began operations in the year 1912. Repairs were made by contracts during the first quarter of that year and by the District, with the use of this plant, during the last three-quarters of the year. The work has been done by the plant continuously since that date. The marked reduction in the cost of repairs for the year 1917 was due to the fact that, by a law which became effective that year, repairs to asphalt pavements over one year old were charged to the repair appropriation instead of being done by paving contractors under five-year guaranty. The yardage of pavement repair was thus increased by nearly 700,000 square yards, on

which practically no expenditures were needed as the pavements were only from 1 to 5 years old. The increase of 1919 over 1918 is entirely due to increased unit costs of labor and material.

SIDEWALKS AND ALLEYS.

The sum of \$220,000 was appropriated for paving sidewalks and alleys in all parts of the District, and the sum of \$25,000 for laying sidewalks and setting curbs around Government reservations, Government buildings, and parks. Sidewalks are paved with cement under contract, and alleys are paved with vitrified block or asphalt block and cement concrete. One thousand eight hundred and eighty-six square yards of vitrified block and 15,869 square yards of cement concrete pavement were laid in alleys. One-half the cost of curb, sidewalk, and alley paving is assessed against abutting property, except that abutting public buildings and public reservations.

The contract price for laying sidewalks during the year was as follows:

For large jobs adjoining paved streets, per square yard-----	\$1.99
For large jobs adjoining unpaved streets and for all small jobs, per square yard -----	2.19

The initiative in the matter of paving sidewalks and alleys is generally left with the owners of abutting property, the commissioners requiring a majority petition for such work before it is ordered. Exceptions are made, however, in cases where, on account of public danger or other public reason, the paving is demanded. The law requires the commissioners to advertise for two weeks their intention to lay sidewalks and curbs and to pave alleys and to give a hearing to the property owners affected. The work is ordered subsequent to such hearing when, in the opinion of the commissioners, it is necessary for the public safety, health, comfort, and convenience. The demand for this class of construction is constant, and increased appropriations for this work could be advantageously expended.

BRIDGES.

The viaduct over tracks of the steam railroads at Bennings Road crossing was practically completed and this dangerous grade crossing thereby eliminated. A viaduct over the Baltimore & Ohio Railroad tracks on the line of South Dakota Avenue was placed under contract and is well advanced in construction.

The wharf used by the Norfolk & Washington Steamboat Co., which was destroyed by fire during the year, was rebuilt by day's labor from the proceeds of the fire insurance policies thereon and is approaching completion. Bids were asked, but none were received, for a new wharf on Water Street SW. between N and M. The funds available were insufficient and this fact deterred all bidders. Additional funds must be secured if this work is to be done.

Portions of the canal wall west of Georgetown were rebuilt by day's labor following the failure of the contractor for the work to carry out his contract. This work is still in progress. A number of culverts of major size were built.

SURVEYOR'S OFFICE.

The work done by the surveyor is of two classes, viz, that done for private parties and that done for the United States and the District of Columbia. For the work done for private parties fees are charged in accordance with a schedule approved by the commissioners. The total amount collected for such work during the year was \$16,456.30 as compared with \$9,565.15 during the previous fiscal year. This shows an increase of about 73 per cent, most of which was taken in during the last six months of the year. The number of surveys made was 1,584 as compared with 718 the previous year.

The number of surveys made for the United States and the District of Columbia, for which no fee is charged, were 2,437 as compared with 1,372 the previous year.

PARKS.

During the war the matter of parks has somewhat laid dormant on account of pressing governmental activities in other matters, but there are few projects that deserve more serious consideration than the acquisition of park area. The city is growing rapidly and crowding out into the undeveloped section of the District, and many places are being destroyed that should be preserved for all time for park purposes. The price of this sparsely settled land is now low, and citizens ride through it and use it for park purposes now, but the time is fast coming when it will not be available for park purposes, and it is urged that this matter be seriously considered before it is too late. Those which would seem to demand immediate attention are:

1. Piney Branch parkway, northeasterly from Sixteenth Street and Piney Branch.
2. The Klinge Road Valley.
3. Mount Hamilton, situated between Bladensburg Road and Eastern Branch.
4. Fort Drive, connecting Rock Creek Park by way of Fort Stevens, Fort Totten, Fort Bunker Hill, and the Eastern Branch Park.
5. Dean tract.

STREET AND ALLEY EXTENSIONS.

Five street and alley cases were confirmed in court during the past year, and there are now pending in court 20 cases. The amount of damages allowed in the five cases confirmed was \$141,074.12, all of which is assessed against the property benefited.

A table appended to the report of the surveyor gives the status of all condemnation cases instituted by the District of Columbia where the proceedings have been taken or completed during the year.

ALLEYS.

An act approved September 25, 1914, known as the "alley law," was suspended by public act No. 156, approved May 23, 1918, for one year following the ratification of the treaty of peace. It is believed

steps should be taken to amend the original act. With the present crowded housing conditions in the District, nothing should be done to increase that condition. To drive some eight or ten thousand people now in alley houses out of those houses would seriously increase the present overcrowded condition. It is believed a number of amendments should be made to this law.

RESUBDIVISIONS OF SMALL LOTS.

At present many small garages are being built, and it is thought the subdivision regulations should be amended so as to permit smaller lots than 800 square feet each, as now provided by the regulations, so that these small garages can be placed on their own individual lots.

TREES AND PARKINGS.

The number of trees planted along the curbs in the streets of the District of Columbia at the close of the fiscal year was 104,254, a decrease under the preceding year of 363. The mileage of trees at the close of the year was 592.36, a decrease of 2.06 miles under the preceding year. The amount expended for the planting and care of trees during the year was \$62,716.33.

It has been the practice to transplant young trees from the nurseries to permanent positions on the streets as rapidly as the surface conditions justify the undertaking of such work and also to replace trees in vacant spaces caused by the removal of trees for various reasons. Due to the scarcity of labor, this work could not be undertaken extensively during the year, and, as a result there are many improved streets where trees have not been planted.

The two municipal nurseries, well stocked with trees, containing about 30 acres of ground, were taken from us, one by the Housing Corporation and the other for the Gallinger Hospital, and no permanent provision has been made for a nursery up to the present time. We are now occupying a small piece of ground known as Fort DuPont under a permit granted by the Chief of Engineers, United States Army. This permit is revocable at will. Approximately 5,000 trees were transferred from the municipal nursery located at Iowa Avenue and Webster Street to the new site. The transfer of this stock was a very difficult matter at the time, due to the scarcity of labor, the constant changes in the personnel of the gangs, and the great amount of preparation required on the unimproved ground. A permanent nursery is an immediate need if the extension of the tree system of Washington is to be maintained at its present standard.

During the year all trees in the entire southwest section of the city were trimmed. In the area covered by this treatment all trees were cleared of dead, low, and other objectionable branches, with the result that they were much improved in appearance. Owing to the scarcity of labor, it was not practicable, without neglecting other urgent work, to cover more territory than this, but it is a matter of growing importance that all of the large trees should receive this attention annually. The "floating gang" accomplished much trimming on individual requests. There is a great amount of trimming

necessary at this time which it is impossible to undertake extensively on account of the scarcity of skilled labor. The total number of trees trimmed during the year was 11,735.

STREET AND ALLEY CLEANING AND COLLECTION AND DISPOSAL OF CITY REFUSE.

The District of Columbia cleans the streets and alleys, collects the garbage, shipping it by railroad to Cherry Hill, Va., where it is reduced to grease and tankage.

Congress has authorized the commissioners, after July 1, 1919, to conduct as municipal functions the operations involved in the collection and disposal of city refuse of every kind. The ash service has been taken over and is now being performed by the District. This leaves but three such services still under contract, viz, the collection of miscellaneous refuse, the collection and disposal of dead animals, and the collection and disposal of night soil.

Street-cleaning cost	\$387,985.05
----------------------	--------------

The following table shows the cost per 1,000 square yards of the various methods of street cleaning for the fiscal years 1915 to 1919, inclusive:

	1915	1916	1917	1918	1919
Hand patrol.....	\$0.132	\$0.132	\$0.145	\$0.189	\$0.261
Machine sweeping.....	.149	.144	.171	.239	.354
Alley cleaning.....	.331	.326	.371	.603	.789
Sweeping.....	.115	.106	.121	.168	.225
Flushing.....	.194	.212	.285	.450	.487
Motor flushing.....				.314	.361

The increased cost is largely attributable to the higher wages paid laborers and drivers, which advanced from \$1.75 and \$2, respectively, in July, 1917, to \$2.88 and \$3.20 in October, 1918, in addition to which additional compensation of \$120 a year was allotted to each regular employee.

By reason of shortage of funds after March 4, it became necessary to stop all hand patrol work and until well into the month of June to limit the cleaning to sweeping with machines.

This was the first year the District collected garbage directly and operated the reduction plant. It was found necessary to make material replacements and betterments to the plant and equipment turned over to the District by the Washington Fertilizer Co. Including the cost of the plant purchased, the cost of entire garbage service from July 1, 1918, to June 30, 1919, was \$495,491.51, but this is to be credited with products sold to the amount of \$230,328.97, making the net cost of plant and operation for the year \$265,162.54.

Garbage was collected regularly during the year from 66,565 places, as follows:

Private residences.....	62,178
Small apartments.....	816
Lunch rooms and cafés.....	403
Hotels and miscellaneous institutions.....	137
Combination residences and stores.....	966
Stores.....	2,065

The cost of this garbage service was considerably greater than when done under contract. This is to be accounted for by the scarcity and high price of labor during the past year, as well as by the low price received for the grease and tankage produced from January 1 to June 30.

A small experiment was made, but not concluded, during the fiscal year in feeding garbage to hogs. Two hundred pigs averaging 100 pounds in weight, were purchased and established on the District farm at Blue Plains. It has been demonstrated that at the present price of pork garbage may be disposed of profitably by this means.

The service rendered by the contractors for the ash and refuse collections was seriously affected by the shortage of labor and the increased cost of both labor and material.

Upon the recommendation of the commissioners, an item of \$22,000 was allowed by Congress for the adjustment of the ash contract, and this was paid the contractor in addition to his contract price of \$78,300.

The contract for the collection of miscellaneous refuse had been let to John G. Faircloth for a period of three years, beginning July 1, 1918. A plant for the separation and salvaging of this trash had been built in Virginia near the end of the Highway Bridge. This plant was burned down in February, 1919, and following this the contract was assumed by J. J. Whitehead Co., who have built and are now operating a new plant at Mount Olivert Road and Montello Avenue.

Recommendations are made:

1. For an appropriation of \$22,500 for the purchase of ground fronting on alleys and the erection thereon of 15 tool houses to take the place of properties which are now rented.
2. That the language of the next appropriation bill be changed so that funds arising from the sale of products from the disposal of city refuse will revert to the credit of the current appropriation instead of being covered into the Treasury.
3. For a change in the law which now permits the transportation by private individuals of table refuse to points outside of the District of Columbia to be fed to poultry and pigs.
4. For the acquisition of land and the erection thereon of three stables at points so located as to minimize hauling.

BUILDING OPERATIONS.

The estimated value of building operations, including repairs, etc., during the year, exclusive of buildings under construction by the Federal Government, is \$10,509,291, an increase over the preceding year of \$354,304.

The number of permits issued for all building construction work was 4,948, an increase of 1,042 over the fiscal year 1918. The total number of new buildings was 1,599, an increase of 642. Of these, 748 were dwellings, an increase of 217; 21 were apartments, an increase of 12; and 830 business buildings, an increase of 411. The number of repairs, etc., was 3,433, as against 2,610 the preceding year.

The estimated values of buildings and of repairs, etc., exclusive of awnings and signs, were distributed as follows:

	Buildings.	Repairs, etc.
Northeast.....	\$241,680	\$113,159
Southeast.....	276,745	111,017
Northwest.....	2,899,437	1,342,260
Southwest.....	252,900	74,507
County.....	4,716,958	480,628
Total.....	8,287,720	2,121,571
Sum total.....	10,509,291	

It is estimated that there are in the District of Columbia 66,629 brick buildings and 27,010 frame buildings. There were 1,267 brick buildings erected during the year and 332 frame buildings; 39 brick buildings razed and 128 frame.

It is worthy of note that during the last three months of the year—April, May, June—the estimated cost of building operations was, respectively, \$2,112,231, \$1,648,609 and \$2,780,986, the largest amount estimated for any previous month of the fiscal year being \$951,570 in August. This is significant as showing the gain in building construction since the close of the war and partial recovery from its immediate after effects. And this despite the unprecedentedly high cost of building materials, the difficulty and uncertainty in the matter of delivery, and the unsettled condition of labor and high wages demanded.

Permits are issued upon the payment of a graduated scale of fees, which are designed to cover the expense incurred in the administration of the building inspector's office. Due to the slump in building, however, during the past several years, this end has not been gained by several thousand dollars; but if the prospects, as indicated by the last several months of the year, are realized, the fiscal year 1920 should show a balance between receipts and expenditures.

CONSTRUCTION OF MUNICIPAL BUILDINGS.

During the year seven buildings were under construction as follows:

Building.	Location.
Fish Wharf and Market.....	Water Street between Eleventh and Twelfth Streets SW.
Elizabeth V. Brown School addition, No. 113.....	Connecticut Avenue, Between McKinley and Northampton Streets NW.
Woodburn School, No. 101, addition for toilets.....	Riggs and Blair Roads, Woodburn, D. C.
Penning School, No. 48, addition for toilets.....	Anacostia Road, Between Penning Road and F Street NW.
Foundry addition to McKinley Manual Training School, No. 130.	Seventh Street and Rhode Island Avenue NW.
Pavilion for 11 schools, School, No. 57.....	Vermont Avenue, Between T and U Streets NW.
Boathouse and sheds on wharf used by the Norfolk & Washington Steamboat Co.	Water and Seventh Streets SW.

Plans and specifications were prepared for 58 improvements. Owing to war conditions, no appropriations were made for new school buildings or additions to existing school buildings for the fiscal year ended June 30, 1919. However, \$231,000 was appropriated for the construction and erection of portable school buildings, including the

necessary grading, improvements, and toilet facilities. In this connection, 40 portable schools were erected in place of permanent buildings which could not be erected during the war.

Comparisons in the cubic cost of buildings erected during the year with buildings erected before the war show that frame or wooden buildings now cost as much as fireproof buildings formerly cost. Prior to the war, the noninflammable school buildings cost 17 cents per cubic foot, while the latest bids for such buildings show a cubic foot cost of 35 cents.

During the first half of the fiscal year building materials could not be obtained, and all building projects, except those directly connected with war work, were placed in the list of nonessentials. The scarcity of labor, the railroad embargoes, and the exhaustion of certain building materials required by the Government made it almost impossible to carry on construction work.

REPAIRS TO MUNICIPAL BUILDINGS.

All municipal buildings are kept in repair under the direction of the municipal architect. These include school buildings, engine houses, police stations, and the police court building. They number about 300 in all. The cost of repairs was much increased during the year, due to increases made in the wages of mechanics and laborers and increase in the cost of material.

In the report of the municipal architect will be found a memorandum on the subject of classroom ventilation which merits special attention.

WORKHOUSE AND REFORMATORY.

The report of the constructing engineer of the workhouse and reformatory is contained in the report of the municipal architect. This report shows the amount of construction work undertaken during the fiscal year. A system of bookkeeping has been adopted by which construction costs may be readily ascertained.

THE DISTRICT BUILDING.

The routine work incident to the care of the District Building involves several distinct functions, viz, the power plant; woodworking, paint, and electrical shops; blue prints and photo shop; printing shop; and the elevator, watch, and cleaning forces. During the year 1,915 tons of coal were consumed, a decrease of 398 tons as compared with the preceding year, due, no doubt, to the mild winter. The electric current generated and consumed amounted to 430,050 kilowatt hours, of which 285,300 kilowatt hours were used for lighting and 144,750 for power. Because of the shortage of labor a portion of the power plant was discontinued from 6 p. m. to 5 a. m. for a period of three months, during which time it became necessary to purchase from the Potomac Electric Power Co. 21,640 kilowatt hours at a cost of $2\frac{1}{2}$ cents per kilowatt hour. The electrical department installed separate lines to the health and police departments for supplying power. Thirty-two thousand and ninety-nine square feet

of blue printing were completed, at a cost of \$1,022.93. Six hundred and thirty-one photographs were completed, at a cost of \$250.64.

The print shop did a business of \$8,724.27, an increase of \$3,951 as compared with the preceding year. The regular appropriation for the care of the building was \$23,000, and a deficiency appropriation of \$12,000 was made, principally for the purchase of coal.

CENTRAL GARAGE.

During the fiscal year ending June 30, 1919, there were maintained and kept in running order by this department 41 automobiles. The garage was necessarily kept open day and night, all machines being washed, supplied with oil and gas by the night force, who also served as watchmen. The laboring force of eight men made the necessary repairs. A battery-charging outfit has been installed. Total expense for maintenance of these cars including gas, oil, tires, and miscellaneous supplies amounted to \$11,548.63, or an average of \$0.0483 per mile. Repair parts amounted to \$2,707.40, or an average of \$0.0113 per mile. Average mileage for each car was 5,946 miles.

STABLES.

The stables located at First and Canal Streets SW, are used by the disbursing officer, sewer department, surface division, surveyor, department of weights, measures and markets, and assessor's office; those at U Street between Sixteenth and Seventeenth Streets NW, by the repair shop, sewer department, and the surface division. The employees at these stables include 1 blacksmith, 1 driver, and 3 watchmen on the annual roll, and 41 drivers, 5 stablemen, and 1 watchman on the per diem roll. The number of animals being cared for is 82, i. e., 49 horses and 33 mules. The average cost of forage for an animal for a year was \$312.24.

PLUMBING AND PLUMBING INSPECTION.

During the year the plumbing office made 26,435 regular inspections compared with 25,995 during the preceding year. It is estimated that the total cost of new plumbing work installed in private buildings was \$778,969, and of repairs and remodeling work, \$561,870. The best available estimates of plumbing work done by the Housing Bureau, the Army, and other Government agencies is \$1,800,000, making a total of more than three millions for plumbing in the District of Columbia. The average number of inspections per day per man, field inspection force, was 13 $\frac{1}{3}$, and the greatest number in any one day by any one man was 38. There were 20 police court cases for violation of the plumbing law, only one of which was dismissed by the court, and fines amounting to \$122 were collected.

Under the compulsory drainage act, 41 cases were forwarded by the health department and other branches of the District government for the installation of sewer and water in those instances where the owner had failed to do the work after notice served upon him. In 16 of these cases the work was done by the owner or agent, in 4 of them the work was done by the District of Columbia and the cost assessed against the property, and there are 21 cases pending,

principally on account of the appropriation being exhausted within the first quarter of the fiscal year.

PLUMBING BOARD.

During the year the plumbing board held 24 sessions for the examination of candidates for license as master plumber and gas fitter. The total number examined was 29. The number of original candidates examined for license for master plumber and gas fitter was 14, of whom 2 passed. Of the 15 who had previously been examined for license, 3 passed and 12 failed.

INSPECTION OF STEAM BOILERS.

The number of steam boilers inspected by the inspector of steam boilers during the year was 431, including 35 for the District of Columbia, and 9 for the United States. Eight boilers were condemned as unfit for further use. The compensation of this official is received from fees paid by the owners of the boilers. The total amount of fees reported by him during the year was \$2,155 and the expenses of inspection \$320, leaving a net compensation to him of \$1,835.

EXAMINATION OF STEAM ENGINEERS.

The board of examiners of steam engineers held 52 examinations and examined 129 applicants, of whom 49 were found competent and 80 not. The board also conducted examinations of applicants for permits of operators of automobiles and motorcycles.

PUBLIC CONVENIENCE STATIONS.

The four public convenience stations located at Seventh Street and Pennsylvania Avenue, Thirteen-and-a-half Street and Pennsylvania Avenue, and Ninth and K Streets NW., and Fifteenth and H Streets NE., were operated during the year from 6 a. m. to midnight with two shifts of attendants, each working nine hours per day. The stations were used over 13,000,000 times during the year and the receipts from pay closets and privileges amounted to \$7,019.75, both being very great increases over last year. Plans for a fifth station at Eighth and F Streets NW. are complete, and locations for other stations are under consideration.

STREET LIGHTING.

There are 19,650 street lamps of all kinds in the District of Columbia, as follows:

Mantle gas	10,431
Electric arc:	
6.6-ampere magnetite	280
4-ampere magnetite	515
Electric incandescent:	
250-candlepower, series	10
200-candlepower, multiple	64
100-candlepower, series	3,772
100-candlepower, multiple	98

Electric incandescent—Continued.	
60-candlepower, series	3,637
60-candlepower, multiple	318
Street designation lamps:	
Gas	394
Electric	131
Total	19,650

This was a net increase during the year of 144 lamps.

The improved incandescent electric lighting was extended during the year in completion of treatment of area Seventeenth and Twenty-third, B and E Streets NW. in vicinity of new Federal Government buildings, on B Street NE. between First and Second, and by the addition of one lamp on Sixteenth Street NW., at Colorado Avenue.

The 64 4-glower Nernst lamps on Connecticut Avenue Bridge across Rock Creek were rated as obsolete by reason of commercial conditions and replaced by 64 200-candlepower filament lamps, effecting a better illumination at less annual cost.

LIGHTS ALONG STEAM RAILROADS.

The situation with respect to the several suits brought by the District of Columbia against steam railroad companies to compel repayment for the sums expended by the District in maintaining lights along the respective rights of way of such companies has been affected only by the obtaining of a verdict and judgment for approximately \$11,000 in a suit against Washington Terminal Co., followed by appeal to Court of Appeals. Further suits have been entered on newly accrued claims.

SIGNAL SYSTEMS—FIRE-ALARM, TELEGRAPH, POLICE PATROL SIGNALS, AND TELEPHONE SERVICE.

There were in service on June 30, 1919, 158,179 miles of underground cable, containing 6,301.206 miles of conductor. The aerial cable in service at the end of the year was about 5 miles, containing 164.71 miles of conductor. There were 1,357 telephones connected to the District system at the end of the year and 27 in use as portable sets by fire and electrical departments, a net increase of 41 in the year. There were 675 fire-alarm boxes in service at the end of the year, 573 on underground and 102 on overhead wires, an increase of 38 over the preceding year; 1,360 box fire alarms and 1,156 local alarms were received during the year, of which 246 box and 46 local were false.

ELECTRICAL INSPECTION.

At the end of the year there were 18,123 line and 981 guy poles of all kinds in overhead electric wire constructions in the District of Columbia, a net increase of 187 and 33, respectively, during the year.

The total number of inspections of wires and apparatus for electric light, heat, and power purposes, not including distribution plant of public-service companies, made during the year was 11,837, an increase of 1,779 over the preceding year. The total amount of fees paid for permits for such installations was \$5,709, an increase of \$505.93. The pronounced falling off in building operations during the year did not result in a diminution in the number of electrical

inspections. With resumption of building activity and by reason of growth in complexity as well as volume of business an increase of inspection force appears essential.

HARBOR FRONT.

The total amount received from the rental of wharves and river frontage placed by law under the direction of the commissioners was as follows:

Potomac River front	\$16,395.60
Anacostia River front	322.50
	16,718.10

The actual water frontage in the District of Columbia devoted to commerce, with the exception of canals, is about 2 miles. The total available water frontage is about 18 miles, of which about 8 miles is set aside for parks and purposes of the United States. The largest amount of wharf property under control of the commissioners is along the Washington Channel. The total frontage along this channel is 9,275 linear feet, of which 4,675 linear feet, between the grounds of the War College and the south curb line of N street south, are under the control of the United States. Of the remaining 4,600 linear feet, 4,021 linear feet are under the jurisdiction of the commissioners, and 559 linear feet, between Thirteenth and Fourteenth Streets, has been designated by Congress as the site of the Federal central heat, light, and power plant.

Along the frontage under the control of the commissioners are located the harbor police station and dock of the harbor boathouse and dock of the fire boat, the District morgue, the municipal fish wharves and market, and a District property yard. The balance of the frontage is leased to private parties.

On the morning of September 2, 1918, the structures used and occupied by the Norfolk & Washington Steamboat Co. at the foot of Seventh Street SW. were destroyed by fire. The insurance available was not sufficient to replace the wharf, and an appropriation was obtained from Congress of \$51,000. The wharf and office buildings have been replaced and are again occupied by the Norfolk & Washington Steamboat Co.

CONDEMNATION OF INSANITARY BUILDINGS.

The board for the condemnation of insanitary buildings held nine meetings and issued orders for the demolition of 116 buildings and the repair of 66 buildings.

Of the buildings ordered to be demolished, 71 were located on streets and 45 on alleys.

Since the creation of the board, May 1, 1906, it has examined 7,284 buildings, of which 2,265 were demolished and 1,700 repaired.

Of the buildings demolished, 1,529 were located on streets and 736 on alleys.

The estimated number of tenants required to secure other living quarters through the action of the board in the demolition of buildings since the creation of the board is 6,510.

The number of tenants benefited by repairs to buildings required to be repaired by the board is 5,796.

Estimated value of repairs required by the board for the year ended June 30, 1919, is \$15,750.

The act of Congress approved September 25, 1914, declaring the use or occupation of any building or other structures erected or placed on or along any alley as a dwelling or residence or place of abode by any person or persons is injurious to life, to public health, morals, safety, and welfare of the District of Columbia, and such use or occupation of any such building or other structure on, from, and after the 1st day of July, 1918, shall be unlawful, was amended by an act of Congress approved May 23, 1918, which amendment provides "that the operation of the second paragraph of section 1 (relating to the use or occupation of alley buildings as dwellings) in the same hereby is postponed until the expiration of one year following the date of the proclamation by the President of the exchange of the ratifications of the treaty of peace between the United States and the Imperial German Government.

There is being made at this time a careful study of the conditions in the alleys of the city, and a census is being taken of the inhabitants of the same. An inspection and enumeration are also being made of the alley buildings. This survey of the alley conditions and buildings is being made with the view of correctly determining the number of dwellings now occupied as such and the number of alley dwellings demolished or converted to some other use since the creation of the board; also to determine the feasibility of extending some of the existing 30-foot alleys now used for dwellings to the abutting streets, making minor streets of the same.

SEWERS.

The construction and maintenance of the sewerage system and the sewage disposal system of the District of Columbia is placed under a division in charge of the sanitary engineer, District of Columbia.

The length of main and pipe sewers constructed during the year was 7.98 miles. The total length of main and pipe sewers on June 30, 1919, was 738.82 miles, of which 147.79 miles are main sewers and 591.03 miles are pipe sewers. There was expended during the year on the sewerage system the sum of \$282,028.55, and on the sewage disposal system, \$83,337.33. The total cost of the sewerage system to June 30, 1919, was \$14,231,065. The cost of the sewage disposal system to the same date was \$4,803,662.25, making a total cost of the complete system to June 30, 1919, \$19,034,727.25.

SEWER CONSTRUCTION.

The following table shows the length and cost of sewers constructed during the year:

Section.	Length.	Cost.
	<i>Feet.</i>	
1. County west of Rock Creek.....	11,984.07	\$103,882.84
2. County east of Rock Creek.....	5,271.37	31,454.10
3. County west of Anacostia River.....	5,193.03	49,074.79
4. County east of Anacostia River.....	8,293.20	83,337.33
5. Washington City.....	11,526.67	97,616.82

In the informing report of the sanitary engineer will be found details of comprehensive drainage studies and continued consideration of river conditions as affected by sewage discharge. While the conditions of river waters at and below outfalls was generally very good, and throughout the year fair, yet they indicate the need in the future of the installation of sewage treatment works. The design of such works is under study.

Extracts from his report, relating to the sewage disposal system and the Metropolitan sewage district, follow:

SEWAGE DISPOSAL SYSTEM.

The main sewage pumping station was in continuous operation throughout the year, handling the sewage of practically the entire District and also the storm water from the 900-acre low area within the dike lines. At the main pumping station sewage to the amount of 25,388,879,000 gallons and 865,155,000 gallons of storm water were pumped during the year, an increase of 1,713,879,000 gallons of sewage over the amount pumped the previous fiscal year. At the Poplar Point pumping station 469,052,000 gallons of sewage were pumped, a decrease of 8,748,000 gallons over the quantity pumped during the previous fiscal year. At the Woodridge pumping station sewage to the amount of 14,519,000 gallons were pumped during the year.

The main sewage outfalls of the disposal system at Grimes, on the Potomac River, were under observation throughout the year, and the river conditions in the vicinity were given careful study. The condition of the river waters in the vicinity of the main outfalls and below was generally very good throughout the year, the beaches were free from any evidence of sewage discharge, and the surface waters clear of the sleek produced from oily wastes. The drop in oxygen content, however, below 50 per cent for the first time in the history of the disposal works may be considered as a warning that the installation of primary treatment works can not be safely deferred for a much longer period. Under appropriation already made, the site for these treatment works is now being acquired, and within the next 12 months it is proposed to submit estimates for beginning construction.

METROPOLITAN SEWERAGE DISTRICT.

The Metropolitan sewerage project, which contemplates the removal of all sewage from Maryland towns now entering small streams which flow into and through the national parks in the District of Columbia, provides for connecting the Maryland interceptors to be laid along the lines of these streams with the sewage disposal system of the District of Columbia. While the work of completing the necessary interceptors within the District is far advanced, no actual construction has been begun by the sanitary commission organized by the State of Maryland of the interceptors within the State and no beneficial results can accrue under the authority granted by Congress and by the State until these Maryland interceptors are built. Meanwhile, the serious contamination of park streams by the discharge of raw sewage from these Maryland towns is increasing, and bacteriological examinations of the waters of the streams indi-

cate that their purity is so affected as to render the spread of water-borne disease probable by children in the parks playing in these streams.

While war conditions unquestionably have had the effect of delaying the sewerage construction necessary to eliminate this stream pollution, it is believed that construction by the State should be begun without further delay in the interest not only of the national parks within the District of Columbia, but also in the interest of the Maryland communities themselves, which are polluting these small streams at their very doors.

This project was originally proposed in my annual report for the fiscal year 1909, from which the following is abstracted:

The only practical solution of this problem is believed to be in the formation of a Metropolitan district, under the control of a State and national board, with power to construct the necessary valley interceptors for the removal of the sewage, and that these interceptors be arranged so as to discharge at the State line into the interceptors of the sewage disposal system of the District of Columbia, the District to be reimbursed for the cost of pumping and handling the sewage from the Maryland towns and villages by a State-collected tax levied upon the communities benefited, which would also defray the cost of construction and maintenance of the State system.

The condition of the streams where they enter the District of Columbia has been under observation throughout the year, and the increase in their pollution by bacteriological determinations has been appreciable. These undesirable conditions are becoming more apparent on account of recent construction of sewerage systems in the bordering Maryland towns where sewage is discharged directly into these streams.

WATER MAINS.

During the year 47,688 feet, or 9.03 miles, of water mains of various sizes were laid, making a total length of mains now in the service of 633.1 miles. The aggregate cost of the water-distribution system to June 30, 1919, was \$4,032,965.59. There were in service at the end of the year 3,610 fire hydrants, 233 public hydrants, 17 sanitary fountains, 156 horse fountains, 42 deep public wells, and 4 shallow wells.

WATER CONSUMPTION AND WASTE.

The per capita consumption of filtered Potomac water can not be given owing to the lack of information as to the present population of the District of Columbia, which has been largely augmented during the year on account of the influx of people due to the war. The total mean daily consumption for the year was 64,428,356 gallons, as compared with 59,606,970 gallons for the preceding year. This increase of practically 5,000,000 gallons per day is mainly owing to the increase in population, but to some extent is due to the large quantities of use and waste of water by the Federal Government and the District of Columbia. It is believed that the present water supply is ample for a population of 500,000 people if properly conserved, and this conservation can only be accomplished when all consumers, including the United States and the District of Columbia, pay for the water used. Neither the United States nor the District of Columbia is now charged for water used, and the only method of arriving at a proper charge would be by a valuation of the water

In the informing report of the sanitary engineer will be found details of comprehensive drainage studies and continued consideration of river conditions as affected by sewage discharge. While the conditions of river waters at and below outfalls was generally very good, and throughout the year fair, yet they indicate the need in the future of the installation of sewage treatment works. The design of such works is under study.

Extracts from his report, relating to the sewage disposal system and the Metropolitan sewage district, follow:

SEWAGE DISPOSAL SYSTEM.

The main sewage pumping station was in continuous operation throughout the year, handling the sewage of practically the entire District and also the storm water from the 900-acre low area within the dike lines. At the main pumping station sewage to the amount of 25,388,879,000 gallons and 865,155,000 gallons of storm water were pumped during the year, an increase of 1,713,879,000 gallons of sewage over the amount pumped the previous fiscal year. At the Poplar Point pumping station 469,052,000 gallons of sewage were pumped, a decrease of 8,748,000 gallons over the quantity pumped during the previous fiscal year. At the Woodridge pumping station sewage to the amount of 14,519,000 gallons were pumped during the year.

The main sewage outfalls of the disposal system at Grimes, on the Potomac River, were under observation throughout the year, and the river conditions in the vicinity were given careful study. The condition of the river waters in the vicinity of the main outfalls and below was generally very good throughout the year, the beaches were free from any evidence of sewage discharge, and the surface waters clear of the sleek produced from oily wastes. The drop in oxygen content, however, below 50 per cent for the first time in the history of the disposal works may be considered as a warning that the installation of primary treatment works can not be safely deferred for a much longer period. Under appropriation already made, the site for these treatment works is now being acquired, and within the next 12 months it is proposed to submit estimates for beginning construction.

METROPOLITAN SEWERAGE DISTRICT.

The Metropolitan sewerage project, which contemplates the removal of all sewage from Maryland towns now entering small streams which flow into and through the national parks in the District of Columbia, provides for connecting the Maryland interceptors to be laid along the lines of these streams with the sewage disposal system of the District of Columbia. While the work of completing the necessary interceptors within the District is far advanced, no actual construction has been begun by the sanitary commission organized by the State of Maryland of the interceptors within the State and no beneficial results can accrue under the authority granted by Congress and by the State until these Maryland interceptors are built. Meanwhile, the serious contamination of park streams by the discharge of raw sewage from these Maryland towns is increasing, and bacteriological examinations of the waters of the streams indi-

cate that their purity is so affected as to render the spread of water-borne disease probable by children in the parks playing in these streams.

While war conditions unquestionably have had the effect of delaying the sewerage construction necessary to eliminate this stream pollution, it is believed that construction by the State should be begun without further delay in the interest not only of the national parks within the District of Columbia, but also in the interest of the Maryland communities themselves, which are polluting these small streams at their very doors.

This project was originally proposed in my annual report for the fiscal year 1909, from which the following is abstracted:

The only practical solution of this problem is believed to be in the formation of a Metropolitan district, under the control of a State and national board, with power to construct the necessary valley interceptors for the removal of the sewage, and that these interceptors be arranged so as to discharge at the State line into the interceptors of the sewage disposal system of the District of Columbia, the District to be reimbursed for the cost of pumping and handling the sewage from the Maryland towns and villages by a State-collected tax levied upon the communities benefited, which would also defray the cost of construction and maintenance of the State system.

The condition of the streams where they enter the District of Columbia has been under observation throughout the year, and the increase in their pollution by bacteriological determinations has been appreciable. These undesirable conditions are becoming more apparent on account of recent construction of sewerage systems in the bordering Maryland towns where sewage is discharged directly into these streams.

WATER MAINS.

During the year 47,688 feet, or 9.03 miles, of water mains of various sizes were laid, making a total length of mains now in the service of 633.1 miles. The aggregate cost of the water-distribution system to June 30, 1919, was \$1,032,965.59. There were in service at the end of the year 3,610 fire hydrants, 233 public hydrants, 17 sanitary fountains, 156 horse fountains, 42 deep public wells, and 4 shallow wells.

WATER CONSUMPTION AND WASTE.

The per capita consumption of filtered Potomac water can not be given owing to the lack of information as to the present population of the District of Columbia, which has been largely augmented during the year on account of the influx of people due to the war. The total mean daily consumption for the year was 64,428,356 gallons, as compared with 59,606,970 gallons for the preceding year. This increase of practically 5,000,000 gallons per day is mainly owing to the increase in population, but to some extent is due to the large quantities of use and waste of water by the Federal Government and the District of Columbia. It is believed that the present water supply is ample for a population of 500,000 people if properly conserved, and this conservation can only be accomplished when all consumers, including the United States and the District of Columbia, pay for the water used. Neither the United States nor the District of Columbia is now charged for water used, and the only method of arriving at a proper charge would be by a valuation of the water

supply and distribution systems and the charging of a proper rate based upon a fair return on the investment.

The cost of operating the pumping engines at the District pumping station was \$94,527.77. The total pumpage for the year was 11,253,358,880 gallons and the average daily amount pumped was 30,822,892 gallons. The amount of coal burned was 7,494.56 tons.

The underground leakage of water detected and prevented during the year was at the rate of 1,160,000 gallons per day, with an average waste per leak of 6,120 gallons per day. The principal cause of leakage was found in corroded iron services, and a large number of calked joints were found defective, indicating a severe leakage from this source. Most of the joint leaks were found in the old 6-inch mains, and but few were found in mains recently installed where sufficient calking was used. The cost of this leak investigation was \$33,462.25 and the results based on the sale price of water at 4 cents per hundred cubic feet represents a 67 per cent return upon the investment.

WATER REVENUES AND EXPENDITURES.

The revenues from all sources during the year, including a balance of \$199,780.73 brought forward, amounted to \$1,016,412.38. The expenditures of the distribution system amounted to \$676,548.99. Advances made on account of the Washington Aqueduct or supply system amount to \$251,548.03. The balance, including \$162,725.53 in the Treasury of the United States, \$3,223.83 in the hands of the collector of taxes of the District of Columbia, and \$51,697.99 in the hands of the disbursing officer of the District of Columbia, is \$217,647.35. This balance is obligated to the extent of \$87,176.86, leaving an unobligated balance under date of June 30, 1919, of \$130,470.49. Of the total cost of the work during the year, 38.1 per cent was for new work and 61.9 per cent for maintenance.

WATER METERS.

During the fiscal year only 394 water meters have been installed, making a total number in use on June 30, 1919, of 61,299. The average cost of installing a meter in a private residence where the work is done by the District is \$18.83, made up as follows: Cost of meter, \$7.75; material, \$5.12; labor, \$5.96. The rate charged for water on metered services is 4 cents per hundred cubic feet for all used in excess of 7,500 cubic feet. The minimum charge to each premises, allowing the use of 7,500 cubic feet, is \$4.50 per annum. On unmetered services the rate for domestic purposes is charged according to stories and front feet. On all houses two stories high with a frontage of 16 feet or less the charge is \$5 per annum, and for each additional front foot or fraction thereof there is added 31 cents to the charges as computed above. For each additional story there is added one-third of the charges as computed above. For business premises not metered the rates vary from \$1 to \$25 per annum. Where the rate is \$25 or more a meter is required to be installed by the owner or occupant of the premises at his own expense. The amount of water rents collected under the flat-rate system was \$75,808.29 and under the meter system \$702,690.88. For water used in building construction the amount collected was \$3,660.19, making a total of \$782,159.36.

In addition to this amount, the water revenues from other sources, such as water-main tax, charges for taps, etc., brought the total receipts up to \$816,631.65. The estimated receipts for the fiscal year 1921 are \$805,500. The total number of water services at the end of the fiscal year was \$71,275, of which 61,299 are metered and 9,976 not metered, making a percentage of services metered 86.

ANACOSTIA PARK.

The total appropriations for this work amount to \$1,175,000 and the total expenditures to August 31, 1919, were \$888,322.40. There are outstanding liabilities to the amount of \$58,196, and \$9,490 are covered by existing contracts.

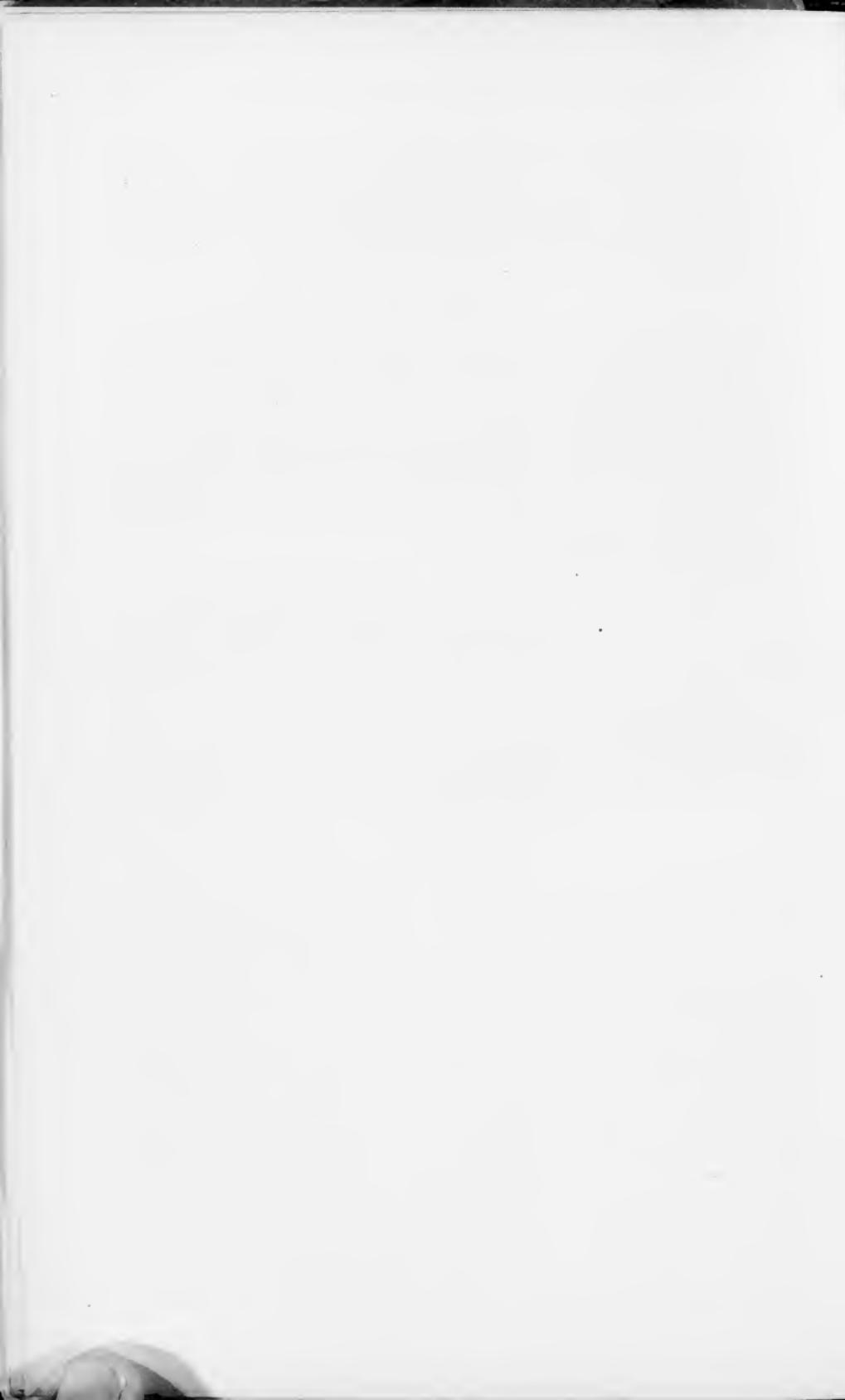
The balance available on August 31, 1919, was \$218,991.60, and it is expected this balance will be expended by June 30, 1920.

The project is 35 per cent completed. This project is being executed under the direction of the Secretary of War, and the details of expenditures will be found in the annual report of the Chief of Engineers of the United States Army.

Respectfully submitted.

LOUIS BROWNLOW,
W. GWYNN GARDINER,
CHAS. W. KUTZ,

Commissioners of the District of Columbia.



REPORT OF THE OPERATIONS OF THE ENGINEER DEPARTMENT OF THE DISTRICT OF COLUMBIA.

REPORT OF THE ASSISTANT ENGINEER COMMISSIONER.

OFFICE OF THE ENGINEER COMMISSIONER OF THE DISTRICT OF COLUMBIA.

Washington, D. C., October 10, 1919.

SIR: I have the honor to transmit herewith annual reports giving in detail the operations during the fiscal year ended June 30, 1919, of the various divisions and offices under my supervision since February 24, 1919, I having taken over on that date certain of the duties previously assigned to Col. J. J. Loving, assistant to the Engineer Commissioner.

Very respectfully,

F. S. BESSON,

Captain, Engineers, United States Army,
Assistant to the Engineer Commissioner.

To the ENGINEER COMMISSIONER.

REPORT OF ENGINEER OF HIGHWAYS.

WASHINGTON, D. C., August 15, 1919.

SIR: I have the honor to submit the following report of the operations of the engineer of highways for the fiscal year ended June 30, 1919. The total amount of funds appropriated by Congress and deposited by corporations and others for disbursement by the surface division aggregated \$1,556,090, of which \$220,000 was for paving sidewalks and alleys in all parts of the District; \$750,600 for paving new roadways and repairing old roadway pavements; \$274,300 for construction and repair of suburban roads; \$30,000 for construction and repair of bridges and viaducts; \$30,000 for grading streets and avenues; \$25,000 for sidewalks and curbs around Government reservations, buildings, and parks; \$226,190.38 was spent in repairing pavements disturbed by other branches of the District government and by various corporations and others.

Summary of work under appropriation for improvements and repairs for year ended June 30, 1919.

Character of work.	Streets and avenues.	Suburban roads and streets.	Repairs to asphalt pavements	Total.
Sheet asphalt pavement.....	square yards.....	25,836.29	19,434.63	6,456.37
Asphalt surface.....	do.....			2,924.92
Asphalt block pavement.....	do.....		5,546.44	
Vitrified block gutters.....	do.....	1,460.03	1,307.98	591.36
Cement concrete pavement.....	do.....	16,604.55	35,738.34	
Macadam roadway.....	do.....		34,320.00	
Cobble and granite gutters.....	do.....		5,950.89	
Old pavement removed.....	cubic yards.....			877.0
Old cobble and granite removed.....	square yards.....	15,742.33	2,386.82	
Granite and bluestone curb set.....	linear feet.....	7,407.66	5,576.21	2,389.41
Cement curb formed and laid.....	do.....		16,484.19	
Curb reset.....	do.....	11,939.07	7,553.64	1,927.27
Grading.....	cubic yards.....	9,744.67	93,952.74	639.50
Sidewalks and curbs under assessment and permit work.....	square yards.....			33,427.35
Sidewalks and curbs around Government reservations.....	square yards.....			6,271.77
Sidewalks, whole cost.....	do.....			701.00
Alley pavements:				
Vitrified block.....	do.....			1,886.00
Cement.....	do.....			15,869.00

The following is a list of tables appended to the report:

Table A.—Street railways in the District of Columbia, July 1, 1919.

Tables B and C.—Statement of character and extent of street pavements.

Table E.—Schedule of work on streets and avenues and county roads, and suburban streets.

Table F.—Repairs to asphalt and coal-tar pavements.

Table G.—Work done for street railway companies.

Table H.—Work done by day labor under appropriation for "Repairs to streets, avenues, and alleys."

Table I.—Regular permit work.

Table K.—Assessment work.

Table L.—Replacing and repairing sidewalks and curbs around public reservations.

Table M.—Miscellaneous work.

Table O.—Repairs to cuts by plumbers and others.

Table N.—Whole cost work.

Table P.—Grading streets, alleys, and roads.

Of the above tables, A, B, and C, and O, are printed herewith. The remaining tables are on file in the record room of the office of the engineer of highways, plan case No. "B-950."

The dominating characteristics of the year's work in its first half was scarcity of labor and material which was so pronounced that only construction work of a character essential to the conduct of the war was undertaken. Maintenance of streets and roads was emphasized but no construction contracts except for approaches to Government buildings were made until the spring of 1919. At that time the year's construction was placed under contract except the construction of suburban roads. All street construction appropriations, due to this enforced postponement of their expenditure were reappropriated as to their unexpended balances for the fiscal year 1920. It is believed that under contracts now made or under advertisement this entire construction program will be practically completed during the present working season, the asphalt portion by September.

The day labor activities were conducted under extreme difficulties and at high costs. The former conditions were ameliorated to a marked extent during the present working season but the latter show no reaction.

The concrete roadway pavements about to be placed under contract embrace about 45,000 square yards and the macadam roadways about 15,000 square yards.

Alleys were paved with cement concrete 15,869 square yards and vitrified block 1,886 square yards.

Sixteenth Street from Montague Street to Alaska Avenue, Massachusetts Avenue from Nebraska Avenue to the District line, and Rhode Island Avenue from South Dakota Avenue to the District line, were completed during the year, they being unfinished work of the preceding year delayed by war conditions.

The viaduct carrying Benning Road over the steam railroad tracks was practically completed during the year, thus eliminating a grade crossing at that point.

Macadam stone for construction and repair of suburban roads was most largely of trap rock from the District's quarry at Dickerson, Md., with additional usage of limestone.

MUNICIPAL ASPHALT PLANT.

The total output of the municipal asphalt plant for the year was 169,392 cubic feet of material, consisting of 144,048 cubic feet of old material mixture, 23,976 cubic feet of asphaltic concrete mixture, and 1,368 cubic feet of topping mixture. The plant was operated for 240 days with an average daily output of 706 cubic feet. In connection with the output of the plant the crusher was operated for 77 days during the year and 3,451 cubic yards of old material hauled to the plant from the various streets was crushed.

Constant attention is given to the maintenance of both the plant and the crusher, repairs being made and parts replaced when necessary, thereby keeping them in the best operating condition possible. This cost is incorporated in the total cost of output shown below.

The following materials in amounts set forth below were purchased for use in manufacturing the output during the year:

Sand, 2,542.15 cubic yards, cost average-----	\$2.105
Haul of bank sand, 61.5 cubic yards, cost-----	1.20
Asphaltic cement, 463.25 tons, cost-----	36.50
Asphaltic cement, 31.11 tons, cost-----	32.50
Screenings, 838 tons, cost average-----	1.425

There were purchased for use in operating the crushed and mixer the following large items:

Fuel oil, 32,338 gallons, cost-----	\$0.09
Coal, 205 tons cost average-----	6.25
Wood, 26 cords, cost-----	10.00
Wood, 25 cords, cost-----	18.00

The cost of operation, including material and labor, are kept from day to day, and the summary of this data for the fiscal year develops the following unit costs for the year's operations:

OPERATION OF CRUSHER.

Period of operation, 77 working days; output of crusher, 3,451 cubic yards. Labor and fuel----- \$4,528.71

Cost per cubic yard, \$1.312.

Maintenance, renewals, and repairs----- 186.17

Cost per cubic yard, \$0.0539.

Overhead costs: The original cost was amortized by deducting 20 per cent from same each year during the first five years of its life.

Cost of crushed product per cubic yard:

Labor and material----- \$1.312

Repairs to plant----- .054

Total cost----- 1.366

OPERATION OF PLANT.

Period of operation, 240 days; total output, 169,392 cubic feet.

At plant:

Labor (5.57 cents per cubic foot)----- \$9,441.68

Fuel oil (1.5 cents per cubic foot)----- 2,522.51

Coal (0.55 cent per cubic foot)----- 931.25

Wood (0.30 cent per cubic foot)----- 508.12

Total (7.92 cents per cubic foot)----- 13,403.56

Haul from plant to street:

Labor (6.98 cents per cubic foot)----- 11,317.02

On street:

Labor (27.35 cents per cubic foot)----- 44,349.67

Painting joints (0.69 cent per cubic foot)----- 1,125.30

Wood (0.20 cent per cubic foot)----- 331.88

Total (28.24 cents per cubic foot)----- 45,806.85

Maintenance and repairs:

At plant (1.26 cents per cubic foot)----- 2,136.58

On street (0.61 cent per cubic foot)----- 989.48

Total, (1.87 cents per cubic foot)----- 3,126.06

Overhead: The original cost was amortized by deducting 20 per cent from same each year during the first five years of its life.

Supervision:

Foremen and overseers (4.34 cents per cubic foot)----- \$7,356.00

Total manufacturing cost per cubic foot:	Cents.
Plant, labor	7.92
Hot haul	6.98
Street work	28.24
Maintenance of plant and tools	1.87
Supervision	4.34
	<u>49.35</u>

The sand used was bought under contract at $87\frac{1}{2}$ cents (average) per cubic yard and hauled from the wharf to the plant at a cost of \$3,133.12 for 2,542.15 cubic yards, or \$1.23 per cubic yard, a total of \$2.105 per cubic yard. In addition to this sand 61.5 cubic yards of bank sand were hauled to the plant and used in the various mixtures, the cost of this haul being \$1.20 per cubic yard. All other expendable material was delivered at the plant site at the cost thereof used herein.

The cost of a cubic foot of old material mixture from the above was as follows:

0.60 cubic foot of old material, at \$1.37 per cubic yard	\$0.0304
0.34 cubic foot of sand at \$0.875 per cubic yard, hauled \$1.23 per cubic yard	.0264
2.10 pounds limestone dust, at \$3.63 per ton	.0038
4.12 ¹ pounds asphaltic cement, at \$35 per ton, plus freight at \$1.50 per ton	.0724

Cost of material	.1330
Manufacturing and placing cost	.4935
Total cost per cubic foot	<u>.6265</u>

Asphaltic concrete mixture:	
0.50 cubic foot screenings at \$1.425 per ton (2,000 pounds)	.0363
0.50 cubic foot sand, at \$0.875 per cubic yard, haul \$1.23 per cubic yard	.0390
4.20 pounds limestone dust, at \$3.63 per ton	.0076
9.16 ¹ pounds asphaltic cement, at \$35 per ton, plus freight, at \$1.50 per ton	.1672

Cost of material	.2501
Manufacturing and placing cost	.4935
Total cost per cubic foot	<u>.7436</u>

Topping mixture:	
1.00 cubic foot of sand, at \$0.875 per cubic yard, haul \$1.23 per cubic yard	.0780
4.20 pounds limestone dust, at \$3.63 per ton	.0076
9.16 ¹ pounds asphaltic cement, at \$35 per ton, plus freight \$1.50 per ton	.1672

Cost of Material	.2528
Manufacturing and placing cost	.4935
Total cost per cubic foot	<u>.7463</u>

The total cost of minor repairs to sheet-asphalt pavements during the year, the same representing the maintenance cost during the year was \$97,068.13. This cost represented the maintenance of all asphalt streets not under guarantee by contractors, a total yardage of 3,157,757. The cost per square yard per year was therefore about 3.07 cents.

For purposes of record and comparison the like annual costs are here stated for past years: 1908, 3.8 cents; 1909, 2.3 cents; 1910, 2.6 cents; 1911, 2.2 cents; 1912, 2.4 cents; 1913, 2 cents; 1914, 1.9 cents; 1915, 1.9 cents; 1916, 1.8 cents; 1917, 1.5 cents; 1918, 1.7 cents.

¹ 10 per cent tare.

The municipal asphalt plant began operations in 1912, repairs being made by contract during the first quarter of that year and with the municipal asphalt plant during the last three quarters of that year and continuously since. The marked reduction for the year 1917 is affected very significantly by the law effective that year by which repairs to pavements over one year old is chargeable to repair appropriations instead of being paid for by the paving contractors under a five-year guarantee as formerly. The yardage of pavement over which our repairs were distributed was thus increased by nearly 700,000 square yards, on which practically no expenditures were needed as the pavements were only from 1 to 5 years old.

In connection with these costs of annual repair it should be considered that some of the streets approximate an age of 40 years and that the average age of those that we have resurfaced in recent past years exceed 25 years. The average age of streets resurfaced in 1910 was 25.8 years; in 1911 was 24.5 years; in 1912 was 25.8 years; in 1913 was 26 years; in 1914 was 28.5 years; in 1915 was 28 years; in 1916 was 29.6 years; in 1917 was 27 years; in 1918 was 26 years; and in 1919 was 26.7 years.

During the year there was purchased from the Cranford Paving Co., under contract No. 6507, the following material in bulk at contractor's plant, to be used in connection with the minor repairs to asphalt pavements and repairs to cuts:

21,496 cubic feet of topping, at 48 cents per cubic foot	\$10,318.08
20,200.8 cubic feet of binder, at 35 cents per cubic foot	7,070.28
	17,388.36

This material was hauled from the plant and laid in the streets by the District of Columbia minor repair forces.

The reason for the above procedure was the abnormal need for repair work on our streets due to war activities and an effort to prevent their deterioration under such excessive use by heavy trucks and other increments of traffic. The plant alone could hardly have fully met such a demand and was not subjected to the injurious strain of attempting it. The prices paid for the material purchased were about equal to our own cost of production with a 15 per cent addition thereto.

My acknowledgments are due to the employees of this division for the work accomplished by the office during the year.

I transmit herewith the reports of the engineer of bridges, the superintendent of streets, the superintendent of suburban roads, and the superintendent of stables.

Very respectfully,

C. B. HUNT,
Engineer of Highways.

ASSISTANT TO THE ENGINEER COMMISSIONER.

Statement showing employees temporarily required in connection with street, road, and bridge construction and repairs, and appropriations and deposits from which paid during fiscal year ended June 30, 1919:

SURFACE DIVISION.

Designation.	Number.	Rate per diem.
Assistant engineers.....	4	3, at \$170 per month; 1, at \$156 per month.
Inspectors.....	12	1, at \$142 per month; 1, at \$140 per month; 1, at \$118 per month; 1, at \$92 per month; and 8, at \$4.50 per day.
Copyists	2	1, at \$130 per month; 1, at \$118 per month.
Computers.....	3	1, at \$155 per month; 1, at \$142 per month; 1, at \$130 per month.
Overseers.....	12	1, at \$150 per month; 1, at \$140 per month; and 10, at \$118 per month and \$4.50 per day.

APPROPRIATIONS FOR WHICH PAID.

Improvements and repairs, District of Columbia, 1919	\$42,956.34
Construction of suburban roads and suburban streets, District of Columbia, 1919	4,855.25
Bennings Viaduct	1,113.75
Deposit of Norfolk & Washington Steamboat Co.	700.00
	49,625.34

REPORT OF THE SUPERINTENDENT OF STREETS.

WASHINGTON, August 29, 1919.

SIR: I have the honor to submit herewith the annual report of the operations under various appropriations for fiscal year ending June 30, 1919.

Table H is a summary of work done under the appropriation for current repairs to streets, avenues, and alleys. The cost of such work was \$89,184.24, including repairs to dangerous holes.

Table I is a list of work done under the permit system, wherein the property owners requested the improvements and paid one-half the cost, the District paying the other half. The cost of this work was \$8,095.70.

Table K is a list of the work done under the assessment system. One-half the cost of such work is charged against the abutting property. The total cost was \$136,994.75.

Table L is a list of work paid from the appropriation for replacing sidewalks and curbs around public reservations. The amount expended was \$14,061.99.

Table M is a list of miscellaneous work charged to various appropriations other than the above.

Table N is a list of work done for individuals at their cost.

H. N. Moss, Superintendent of Streets.

The ENGINEER OF HIGHWAYS.

REPORT OF THE SUPERINTENDENT OF SUBURBAN ROADS.

OCTOBER 9, 1919.

SIR: The following report of work during the fiscal year ended June 30, 1919, is respectfully submitted:

Construction of suburban roads and suburban streets.—Work was about completed during the year on the unfinished items of construction under the appropriation for 1917, which was renewed for this year. These included the macadamizing of Massachusetts Avenue and Rhode Island Avenue to the District line. The macadamizing of Sixteenth street to Alaska Avenue was in progress under contract at the close of the year, and was about 90 per cent completed.

Work was also in progress during the year upon the unfinished items of construction under the appropriation for 1918. The contract of E. G. Gummel for paving cement roadways under this appropriation was annulled by agreement after about one-half of the work had been completed. The work was readvertised and contract for the completion of this work awarded to the Continental Contracting Co., of Baltimore, Md. The work was still in progress at the end of the year. Work under the contract with the G. B. Mullin Co. for grading and improving streets to be macadamized, under the appropriation for 1918, which had been renewed, was completed during this year, except that on South Dakota Avenue which was placed under contract but not commenced.

Under the appropriation for construction of suburban roads and suburban streets for the fiscal year 1919 the work of constructing cement roadways was divided into two groups, and contracts for this work were awarded to the Continental Contracting Co., of Baltimore, Md., and to Corson & Gruman, of Ocean City, N. J., but no work was done during the year under these contracts. The work of grading and improving certain streets to be macadamized was placed under contract with the Continental Contracting Co., but no work was done under their contract. The work of macadamizing Whittier street NW. between Georgia Avenue and Blair Road, except the heavy grading, was done by hired labor. Various contracts for heavy grading were let separately.

Repairs to suburban roads.—The work of repairs and maintenance was carried on as usual by hired labor, all materials being purchased and delivered under contract, due to the high price of labor and materials, the cost of work was greatly enhanced and the appropriation of \$200,000 was quite insufficient to maintain the heavily traveled roads in good condition. It was distributed

between the four sections of the District outside of the original cities of Washington and Georgetown, bounded approximately as indicated below, as shown in the following statement:

Section 1, Potomac River to Rock Creek-----	\$46,989.10
Section 2, Rock Creek to Soldiers' Home-----	49,940.86
Section 3, Soldiers' Home to Eastern Branch-----	38,280.76
Section 4, Eastern Branch to Potomac River-----	30,829.40

Stone, hauling and miscellaneous work (not separated)-----	166,580.12
Unpaid bills-----	32,552.00
	867.88
Appropriation-----	200,000.00

The largest single items were as follows:

Streets in American University Park-----	3,685.47
Wisconsin Avenue, Thirty-fifth Street to District line-----	2,748.94
Massachusetts Avenue, California Avenue to Nebraska Avenue-----	2,125.76
Connecticut Avenue, Pierce Mill Road to District line-----	3,198.57
Georgia Avenue, Rock Creek Church Road to Buchanan Street (re-surfaced)-----	8,787.11
Georgia Avenue, Rock Creek Church Road to Buchanan Street (re-surfaced)-----	3,165.52
Georgia Avenue, Upshur Street to Military Road (repair)-----	2,706.82
Georgia Avenue, Military Road to District line (repair)-----	2,796.85
Blair Road, Riggs Road to Butternut Street-----	2,326.37
Michigan Avenue, North Capitol Street to Eighteenth Street-----	4,657.94
Bladensburg Road, Fifteenth Street to District line-----	10,019.29
Rhode Island Avenue NE., Second Street to South Dakota Avenue-----	5,009.21
Pennsylvania Avenue SE., Branch Avenue to Bowen Road-----	3,587.09
Sheridan Avenue, Stanton to Pomeroy Roads-----	1,632.79
Bowen Road SE., Good Hope Road to District line-----	1,405.71
Nichols Avenue SE., Sheridan Avenue to South Capitol Street-----	1,460.88
Oiling and tarring streets and roads (labor and teams)-----	14,900.34
Watering streets and roads (teams)-----	2,959.88

Further detailed statements of expenditures are filed in the office of the Engineer of Highways.

The continuation and extension of projects for paving the trunk line streets to the District line as rapidly as funds can be obtained for the purpose is recommended. The streets now partly provided for under these projects are Connecticut Avenue NW, as far as Pierce Mill Road (completed); Rhode Island Avenue NE, Fourth to Twelfth Streets (under construction); and Georgia Avenue between Buchanan Street and Military Road (under contract). The completion of such projects will greatly decrease the amount to be expended for repairs on the streets so paved and will enable them to be maintained in far better condition than at present, with resultant economy and comfort to the traffic over them.

L. R. GRABILL,

Superintendent of Suburban Roads, District of Columbia.

The ENGINEER OF HIGHWAYS.

REPORT OF THE ENGINEER OF BRIDGES.

WASHINGTON, D. C., August 22, 1919.

Sir: I have the honor to submit the following report of the operations under my charge for the fiscal year ending June 30, 1919.

The expenditures from the appropriation for the construction and repair of bridges were as follows:

Bridge No.	Character of work.	Cost.
27	Connecticut Avenue over Klinge Road, repairs.....	\$228.28
35	M Street over Rock Creek, paint.....	23.50
27	Connecticut Avenue over Klinge Road, repairs.....	41.50
27	Connecticut Avenue over Klinge Road, repairs to handrail.....	98.00
30	Calvert Street over Rock Creek, refloor.....	4,794.10
30	Calvert Street over Rock Creek, repairs.....	246.87
34	P Street over Rock Creek, repairs.....	168.86
	Portable field office.....	57.48
		<u>5,658.59</u>
	Dangerous holes and minor repairs:	
	July, 1918.....	\$338.16
	August, 1918.....	349.22
	September, 1918.....	91.79
	October, 1918.....	8.25
	November, 1918.....	434.06
	December, 1918.....	139.73
	January, 1919.....	11.16
	February, 1919.....	69.42
	March, 1919.....	64.82
	April, 1919.....	5.29
	May, 1919.....	64.17
	June, 1919.....	138.64
	Hire of horse and buggy.....	1,714.71
	Tools.....	275.30
	Coal.....	5.50
	Salaries.....	42.47
	Lumber (estimated).....	5,109.20
	Contract No. 6519.....	6,630.58
	Contract No. 6669.....	4,254.88
	Miscellaneous.....	2,945.25
		<u>720.82</u>
	Less materials purchased from previous appropriations.....	<u>27,387.00</u>
		<u>2,464.32</u>
	Total net expenditures.....	<u>24,922.68</u>
	RECAPITULATION.	
	Appropriation.....	25,000.00
	Repayment by railway companies.....	3,013.81
		<u>28,013.81</u>
	Total net expenditures.....	<u>24,922.68</u>
	Balance.....	<u>3,091.13</u>
		<u>28,013.81</u>

The construction of a portable field office for use at the Benning Viaduct was completed at a cost of \$57.48.

Bridge No. 30 (Calvert Street), reflooring completed with the exception of dummy.

Lumber was purchased for reflooring half of bridge No. 54 (Pennsylvania Avenue over the Anacostia River).

Reconstruction of a portion of the canal wall was readvertised, following the failure of William F. Cushing, contract No. 6355. Bid received from W. D. Murry & Co. was rejected and construction was ordered done by day labor. Construction in progress.

Contract No. 6519, which was entered into the previous fiscal year with Charles H. Tompkins, for the extension of culvert at the intersection of Bladensburg Road and New York Avenue on the basis of cost plus 20 per cent was completed at a cost of \$6,896.45.

Contract No. 6669 was entered into with Charles H. Tompkins for the construction of culvert in Concord Avenue between Third and Fourth Streets. Work completed at a cost of \$3,500.

Contract No. 6475 with the Snare & Triest Co. for construction of the Benning Viaduct was extended from April 12 to September 1. Work progressing and nearly completed.

Wharf, Norfolk & Washington Steamboat Co., was practically destroyed by fire. Insurance policies, to the benefit of the District of Columbia, aggregating

\$25,674.46, were used for reconstruction by day labor. Reconstruction is progressing, but has been greatly delayed, due to inability to secure delivery of timber.

Wharf between M and N Streets SW. Temporary occupation by the Norfolk & Washington Steamboat Co. has prevented readvertisement for proposals for reconstruction of same. Plans and specifications were prepared and proposals invited for this work during the previous fiscal year. No bids were received.

Contract No. 6675 was entered into with Charles H. Tompkins for the construction of a viaduct in the line of South Dakota Avenue NE, crossing the tracks of the Baltimore & Ohio Railroad, under an appropriation of \$65,000. Work is progressing.

Contract was made with the Shull Co. to furnish and install electrical apparatus in the south draw electrical machinery control house of the Anacostia Bridge at a cost of \$135.

The most important projects for consideration are—

The widening and strengthening of the Calvert Street Bridge, which was included in the estimates of this office for the next fiscal year. Estimated cost, \$193,000.

Bridge No. 1, known as Chain Bridge, is about 3 miles above Georgetown and connects Canal Road with the Leesburg Turnpike in Virginia. It was erected by the Phoenix Bridge Co. under a contract with the United States dated November 14, 1873, and was completed in March, 1874. It consists of 6 spans 172 feet each and 2 spans 160 feet each. It will carry with safety a distributed load of 75 pounds per square foot, or a concentrated vehicular load of 6 tons with $7\frac{1}{2}$ feet wheel base, 5 feet gauge, or a concentrated load of 8 tons with 15 feet wheel base, 5 feet gauge. In the year 1910 an outward movement of the abutment on the Virginia side was discovered, which was attributed to heavy blasting in the adjacent quarry, which was shortly thereafter abandoned. Steps were taken to discover if the movement was progressive, but no evidence of progression has been discovered. The other abutment and piers are in reasonably good condition.

The wheel loads crossing bridges have increased so much in the past few years that it is difficult to prevent loads exceeding those permissible from crossing, and for that reason this bridge should be replaced by a structure to meet present-day conditions. Because of the uncertainty as to the stability of the Virginia abutment that should be replaced. Estimates of the cost of this work are in course of preparation.

The plans prepared for the connecting parkway in Rock Creek Valley will require the replacement of the bridges at M and at P Streets to afford adequate headroom for the connecting driveways.

D. E. McCOMB,
Engineer of Bridges.

To the ENGINEER OF HIGHWAYS.

REPORT OF THE SUPERINTENDENT OF STABLES.

WASHINGTON, D. C., October 13, 1919.

Sir: I have the honor to submit the following report showing the operation of the stables under the care of the superintendent of stables, engineer department, District of Columbia, for the fiscal year ended June 30, 1919.

Location of stables: First and Canal Streets SW.; U Street NW. between Sixteenth and Seventeenth.

Number of employees, annual: One superintendent, one blacksmith, one driver, and three watchmen.

Number of employees, per diem: Four stablemen, 1 watchman, and 39 drivers.

Number of horses and mules and departments to which assigned.

	Horses.	Mules.
Disbursing office.....	1	
Electrical department.....	1	
Repair shop.....	18	
Sewer department.....	7	21
Surface division.....	18	11
Surveyor.....	2	
Weights, measures, and markets.....	3	
Emergency.....	1	
Total.....	51	32

Cost of forage, etc., for animals.

Forage (allowance for 1 animal for 1 month):

100 pounds rye straw, straight No. 2, at \$0.96 per 100 pounds.....	\$0.96
210 pounds long timothy hay, at \$2.985 per 100 pounds.....	6.27
210 pounds mixed clover hay, at \$1.992 per 100 pounds.....	4.18
384 pounds oats, at \$2.47 per 100 pounds.....	9.48
50 pounds bran, at \$2.09 per 100 pounds.....	1.05
Total per month.....	21.94
Forage for 1 animal for 1 year.....	263.28
Shoes, \$1.35 per month.....	16.20
	279.48

B. J. LYNCH,
Superintendent of Stables.

To the ENGINEER OF HIGHWAYS.

TABLE A.—*Street railroads in operation in District of Columbia June 30, 1919.*

Name of company.	Underground electric.		Overhead electric.		Total.
	Double track.	Single track.	Double track.	Single track.	
Washington Railway & Electric Co.....	23.19	6.34	26.77	3.99	60.29
Capital Traction Co.....	20.19	4.30	3.57	.....	28.06
Washington & Virginia Co.....	.....	.46	.....	.....	.46
East Washington Traction Co.....	.....	.....	.....	.50	.50
Washington Interurban Co.....	.....	.....	.....	2.65	2.65
Washington & Maryland Co.....	.....	.....	.....	2.33	2.33
Total.....	43.38	11.10	30.34	9.47	94.29
Tracks used in common by Capital Traction Co. and Washington Railway & Electric Co.....	1.55	.....	.....	.....	1.55
Tracks used in common by Washington Railway & Electric Co. and Washington & Virginia Co.....	.70	.....	.....	.....	.70
Total.....	45.63	11.10	30.34	9.47	96.54

TABLES B AND C.—*Character and extent of roadway pavements July 1, 1919.*

SQUARE YARDS.

Section.	Asphalt.	Asphalt block.	Asphaltic concrete, concrete base.	Asphaltic concrete, stone base.	Cement concrete	Durax block (small granite block).	Granite and rubble.
Northwest, city.....	1,783,967	25,323	9,674	6,372	17,489	12,234	103,334
Notheast, city.....	382,747	200,671	3,127	.....	.....	.....	18,289
Southeast, city.....	218,621	24,573	8,019	4,082	.....	.....	42,872
Southwest, city.....	270,02	40,436	13,535	.....	4,210	.....	100,354
Georgetown.....	153,972	23,075	4,144	905	.....	.....	33,166
Notheast, su'urban.....	321,851	84,133	25,855	36,680	119,186	.....	23,945
Notheast, sub'urban.....	58,347	6,925	14,354	.....	18,814	.....	5,971
Southeast, suburban.....	14,424	.....	.....	3,049	8,540	.....	1,000
Total.....	3,204,361	630,636	78,708	51,088	108,239	12,294	391,931

Section.	Vitrified block.	Cobble.	Mac- adam (esti- mated).	Gutters on asphal- tic streets.	Gutters on asphal- tic concrete streets.	Pave- ments main- tained by street railroads.	Total.
Northwest, city.....	9,855	27,149	31,630	117,338	1,128	287,110	2,432,663
Notheast, city.....	3,882	52,550	30,737	231	69,316	761,550	761,550
Southeast, city.....	13,122	46,700	15,567	898	48,328	648,082	648,082
Southwest, city.....	3,138	9,246	10,300	23,906	1,254	56,820	593,261
Georgetown.....	515	12,018	3,000	5,750	498	31,816	272,459
Notheast, su'urban.....	.....	1,320,598	25,224	5,871	54,765	2,018,08	2,018,08
Notheast, su'urban.....	.....	385,975	4,881	1,049	9,000	505,316	505,316
Southeast, suburban.....	.....	80,371	5,133	272	7,370	120,729	120,729
Total.....	17,390	62,135	1,931,124	229,036	11,201	564,525	7,352,668

MILEAGE.

Section.	Asphalt.	Asphalt block.	Asphaltic concrete, concrete base.	Asphaltic concrete, stone base.	Cement concrete	Durax block (small granite block).
Northwest, city.....	91.70	1.57	0.51	0.24	0.90	0.30
Notheast, city.....	19.93	8.99	.19	.....	.....	.....
Southeast, city.....	11.74	12.43	.43	.17	.....	.....
Southwest, city.....	14.18	2.37	.68	.....	.22	.....
Georgetown.....	9.14	1.51	.49	.06	.....	.....
Northwest, su'urban.....	17.83	4.55	1.31	2.00	6.53	.....
Notheast, suburban.....	3.87	.63	.97	.....	1.04	.....
Southeast, suburban.....	1.21	.....	.....	.21	.30	.....
Total.....	170.10	32.05	4.58	2.08	8.99	.30

Section.	Granite and rubble.	Vitrified block.	Cobble.	Macadam (estimated).	Gravel and unim- proved (estimated).	Total.
Northwest, city.....	5.61	0.50	1.29	1.00	2.54	106.76
Notheast, city.....	.91	.24	.....	2.96	4.75	37.97
Southeast, city.....	2.50	.....	.66	2.21	7.69	37.83
Southwest, city.....	8.25	.27	.41	.52	2.90	30.30
Georgetown, city.....	2.39	.03	.64	.06	.76	15.08
Northwest, su'urban.....	1.13	.....	.....	82.95	54.31	170.61
Notheast, suburban.....	.61	.....	.....	27.45	42.75	77.32
Southeast, suburban.....	.04	.....	.....	6.30	35.58	43.64
Total.....	21.44	1.04	3.00	124.05	151.28	519.51

Number of horses and mules and departments to which assigned.

	Horses.	Mules.
Disbursing office.....	1	
Electrical department.....	1	
Repair shop.....	18	
Sewer department.....	7	21
Surface division.....	18	11
Surveyor.....	2	
Weights, measures, and markets.....	3	
Emergency.....	1	
Total.....	51	32

Cost of forage, etc., for animals.

Forage (allowance for 1 animal for 1 month):

100 pounds rye straw, straight No. 2, at \$0.96 per 100 pounds.....	\$0.96
210 pounds long timothy hay, at \$2.985 per 100 pounds.....	6.27
210 pounds mixed clover hay, at \$1.992 per 100 pounds.....	4.18
384 pounds oats, at \$2.47 per 100 pounds.....	9.48
50 pounds bran, at \$2.09 per 100 pounds.....	1.05
Total per month.....	21.94

Forage for 1 animal for 1 year.....	263.28
Shoes, \$1.35 per month.....	16.20
	279.48

B. J. LYNCH,
Superintendent of Stables.

To the ENGINEER OF HIGHWAYS.

TABLE A.—*Street railroads in operation in District of Columbia June 30, 1919.*

Name of company.	Underground electric.		Overhead electric.		Total.
	Double track.	Single track.	Double track.	Single track.	
Washington Railway & Electric Co.....	23.19	6.34	26.77	3.99	60.29
Capital Traction Co.....	20.19	4.30	3.57		28.06
Washington & Virginia Co.....		.46			.46
Fast Washington Traction Co.....				.50	.50
Washington Interurban Co.....				2.65	2.65
Washington & Maryland Co.....				2.33	2.33
Total.....	43.38	11.10	30.34	9.47	94.29
Tracks used in common by Capital Traction Co. and Washington Railway & Electric Co.....	1.55				1.55
Tracks used in common by Washington Railway & Electric Co. and Washington & Virginia Co.....	.70				.70
Total.....	45.63	11.10	30.34	9.47	96.54

TABLES B AND C.—*Character and extent of roadway pavements July 1, 1919.*

SQUARE YARDS.

Section.	Asphalt.	Asphalt block.	Asphaltic concrete, concrete base.	Asphaltic concrete, stone base.	Cement concrete	Durax block (small granite block).	Granite and rubble.
Northwest, city.....	1,783,967	25,323	9,674	6,372	17,489	12,234	103,334
Notheast, city.....	382,747	200,671	3,127	.....	.....	.....	18,289
Southeast, city.....	218,921	24,573	8,019	4,082	.....	.....	42,872
Southwest, city.....	270,0.2	40,436	13,535	.....	4,210	.....	100,354
Georgetown.....	153,972	23,075	4,144	905	.....	.....	35,166
Northwest, suburban.....	321,851	84,133	25,855	36,680	119,186	.....	23,945
Notheast, suburban.....	58,347	6,925	14,354	.....	18,814	.....	5,971
Southeast, suburban.....	14,474	.....	.....	3,049	8,540	.....	1,000
Total.....	3,204,361	630,636	78,708	51,088	168,239	12,294	391,931

Section.	Vitrified block.	Cobble.	Mac- adam (estim- ated).	Gutters on asphaltic streets.	Gutters on as- phaltic concrete streets.	Pave- ments main- tained by street railroads.	Total.
Northwest, city.....	9,855	27,149	31,630	117,338	1,128	287,110	2,432,663
Notheast, city.....	3,882	.....	52,550	30,737	231	69,316	761,550
Southeast, city.....	.....	13,122	46,700	15,567	898	48,328	648,082
Southwest, city.....	3,138	9,246	10,300	23,906	1,254	56,820	593,261
Georgetown.....	515	12,618	3,000	5,750	498	31,816	272,459
Northwest, suburban.....	.....	.....	1,320,598	25,224	5,871	54,765	2,018,068
Notheast, suburban.....	.....	.....	383,975	4,881	1,049	9,000	505,316
Southeast, suburban.....	.....	.....	80,371	5,133	272	7,370	120,729
Total.....	17,390	62,135	1,931,124	229,036	11,201	564,525	7,352,668

MILEAGE.

Section.	Asphalt.	Asphalt block.	Asphaltic concrete, concrete base.	Asphaltic concrete, stone base.	Cement concrete	Durax block (small granite block).
Northwest, city.....	91.70	1.57	0.51	0.24	0.90	0.30
Notheast, city.....	19.93	8.99	.19	.....	.....	.....
Southeast, city.....	11.74	12.43	.43	.17	.....	.....
Southwest, city.....	14.68	2.37	.68	.....	.22	.....
Georgetown.....	9.14	1.51	.49	.06	.....	.....
Northwest, suburban.....	17.83	4.55	1.31	2.00	6.53	.....
Notheast, suburban.....	3.87	.63	.97	.....	1.04	.....
Southeast, suburban.....	1.21	.....	.....	.21	.30	.....
Total.....	170.10	32.05	4.58	2.8	8.99	.30

Section.	Granite and rubble.	Vitrified block.	Cobble.	Macadam (estimated).	Gravel and unim- proved (estimated).	Total.
Northwest, city.....	5.61	0.50	1.29	1.00	2.54	106.76
Notheast, city.....	.91	.24	.....	2.96	4.75	37.97
Southeast, city.....	2.50	.....	.66	2.21	7.69	37.83
Southwest, city.....	8.25	.27	.41	.52	2.90	30.30
Georgetown, city.....	2.39	.03	.64	.06	.76	15.08
Northwest, suburban.....	1.13	.....	.....	82.95	54.31	170.61
Notheast, suburban.....	.61	.....	.....	27.45	42.75	77.32
Southeast, suburban.....	.04	.....	.....	6.30	35.58	43.64
Total.....	21.44	1.04	3.00	124.05	151.28	519.51

TABLE O.—*Number of square yards and cost of repairs to cuts in streets, avenues, and alleys during the fiscal year ended June 30, 1919.*

Item No. 1 shows the cost of repairs to cuts charged various plumbers, public-service corporations, and individual depositors. Five per cent is added to "whole cost work" for the maintenance of the miscellaneous trust fund deposits (District of Columbia), operating account streets, this fund being used to pay for labor, tools, various materials, etc., used in connection with the repairing of cuts.

Item No. 2 shows the cost of work done on account of various appropriations of the sewer department.

Item No. 3 shows the cost of work done on account of the water department.

Item No. 4 shows the cost of work charged against other appropriations of the District of Columbia and various appropriations of the General Government.

Item No. 5 shows the number of square yards of various kinds of pavements repaired.

PLUMBERS, PUBLIC-SERVICE CORPORATIONS, AND INDIVIDUAL DEPOSITORS.

	Flat rate.	Whole cost.	Total.
Item No. 1:			
Plumbers.....	80,054.42		80,054.42
Corporations.....	45,588.86	89,975.22	145,564.08
Individual depositors.....	7,625.96	4,468.95	12,094.91
Item No. 2:			
Sewer department.....	954.04	5,402.60	6,356.64
Item No. 3:			
Water department.....	5,516.84	14,216.68	19,733.52
Item No. 4:			
Miscellaneous appropriations.....	6,897.75	26,489.06	33,386.81
Total.....	75,637.87	150,552.51	226,190.38

	Square yards.		Total.
	Flat rate.	Whole cost.	
Item No. 5:			
Sheet asphalt.....	3,454.35	7,961.59	11,415.94
Vitrified block.....	860.56	2,611.01	3,415.57
Asphalt block.....	1,270.66	4,310.36	5,581.02
Brick.....	2,094.00	4,637.37	6,731.37
Cement sidewalk.....	8,984.71		8,984.71
Granite block.....	890.26	3,528.88	4,419.14
Macadam.....	532.05	83.70	615.75
Concrete.....	41.68	133.08	174.76
Scoria and Durax.....	31.60	1,378.77	1,410.37
Wood block.....	8.33		8.33
Cobble.....	188.78	174.79	363.57
Total.....	18,357.08	24,819.55	43,176.53

Total number of charges made for repairing cuts, etc., 8,028.

REPORT OF STREET CLEANING AND CITY REFUSE DIVISION.

WASHINGTON, D. C., August 28, 1919.

SIR: I have the honor to submit the following report of the operations of the street-cleaning division, engineer department, for the fiscal year ended June 30, 1919:

The operations of this division included in addition to the cleaning of streets and alleys, the collection and disposal of the garbage of the city and the supervision of contracts for the collection and disposal of ashes, trash, dead animals, and night soil.

The funds available to carry on this work during the year were as follows:

Streets: Dust prevention and cleaning, original appropriation \$340,000, deficiency appropriation \$34,000.

Paving yard at southeast street-cleaning stable, reappropriated, \$5,000.

Disposal of city refuse, original appropriation, \$608,997; deficiency appropriation, \$220,000.

Adjustment of ash contract, \$22,000.

STREET CLEANING.

The appropriation for the cleaning of streets for the year 1919 of \$340,000 was estimated for when labor was receiving a wage much lower than it was necessary to pay during the year covered by this report.

On July 1, 1917, the rate of pay for laborers was \$1.75 and for drivers \$2. November 1, 1917, these rates were increased to \$2 and \$2.25, respectively. On March 1, 1918, they were again increased to \$2.25 and \$2.50, and on April 1, 1918, to \$2.50 and \$2.75. On July 1, 1918, they were \$2.75 and \$3, and on October 1, 1918, they were increased to \$2.88 and \$3.20. During this year the pay roll for the months of July, August, September, and October was 60 per cent greater than for the same period during the previous year, notwithstanding that the force employed during this year was only 88 per cent of that of the previous year. Similarly, during the months of November, December, January, and February, the rate of pay involved an increase of 63 per cent over that of the previous year, and in March, April, May, and June the increase in the rate of pay was 33 per cent above that paid in those months during the previous year. The consequence was that the appropriation proved inadequate to do the work properly, and it became necessary to request an appropriation to cover the expected deficiency. The Congress adjourned March 4 without passing the bill carrying this deficiency appropriation, and after this date it became necessary to stop all hand-patrol work, to reduce the rate of pay of such men as were continued to be employed to \$2.70 per day, and to limit the cleaning force to sweeping with machines. By using many of the street-cleaning teams on other work in the engineer department and getting credit therefor by transfer vouchers and by obligating, but not paying bills for forage, etc., it was possible to get through the year with a deficiency item of \$34,000.

Of this \$34,000, under authority of Congress, \$6,000 was paid to laborers whose pay had been reduced so as to make their rate of compensation for the period between March 5 to June 1, 1919, equal to the rate paid them prior to March 5, 1919. It is to be understood that in addition to the amount paid out for labor under appropriations made for street-cleaning work there was additional compensation allotted each regular employee of \$120 per year.

No snow and ice work whatever was done during the year, the weather being so mild that such work was not necessary.

As a measure of economy specific recommendation has been made in the estimates for an appropriation of \$22,500 for the purchase of ground fronting on alleys and the erection thereon of 15 tool houses to take the place of properties which the division now rents. This division now pays \$1,782 yearly for the rental of 13 such places and increased rent is being demanded.

Tables similar to those furnished in previous reports are submitted showing the comparison in cost of work done this year with past years.

GARBAGE COLLECTION AND DISPOSAL.

On July 1, 1918, the District took over the plant and equipment of the Washington Fertilizer Co. and beginning with that date has collected the garbage and operated the reduction plant at Cherry Hill, Va.

The plant and equipment was in such condition as to necessitate material replacements and betterments. The yard where transfer is made of filled garbage tanks to railroad cars was in such wet and insanitary condition that it was necessary to pave its entire surface.

The unloading facilities were insufficient, and a traveling crane was purchased for use in the yard and an additional derrick for use at the reduction plant. On account of the difficulty in securing sufficient labor and because of the overcrowded situation of the city, motor trucks were hired to expedite the collection and removal of the garbage, so that the cost of the collection service and of the operation of the factory was much larger than it normally would be.

Including cost of the plant purchased, the net cost of entire garbage service from July 1, 1918, to June 30, 1919, was \$205,162.54. At the reduction plant there was produced grease and tankage to the value of \$230,328.97, which money was covered into the Treasury of the United States, and this sum is assumed as a credit in showing the net cost of service given above.

Garbage is collected from 62,178 private residences, 816 apartments, 403 lunch rooms and cafés, 137 hotels and miscellaneous institutions, 966 combination residences and stores, and from 2,065 stores; a total of 66,565 places.

A small experiment was made, but not concluded, during the fiscal year in feeding garbage to hogs. Two hundred pigs averaging 100 pounds in weight were purchased and established on the District farm at Blue Plains. It has been demonstrated that at the present price of pork garbage may be disposed of profitably by this means, but it can not be undertaken on a large scale unless the Congress is willing to permit the revenue from disposal to revert to the appropriation, so that when one lot of hogs is fattened and sold, another lot may be purchased and the operation made continuous. During a 12-month period such operation would involve the purchase and sale of three lots of hogs, each lot costing, at present prices, from \$250,000 to \$350,000. As an adjunct to the reduction plant and to absorb the garbage when it is excessive in bulk but poor in grease, it is believed pig feeding by the District could be successfully carried on.

For this reason the language of the next appropriation bill should be changed so that the commissioners could purchase hogs in such numbers as circumstances warranted and when fattened sell, and the revenue from garbage thereby materially increased without necessitating the enlargement of the present reduction plant. This plant is now too small, and it is not economical of operation. A new up-to-date plant must soon be built, but its capacity need not be so great if the peak of the load can be taken care of by feeding to hogs.

This can best be done at the reformatory at Occoquan. A railroad connection should be had with the Richmond, Fredericksburg & Potomac Railroad at Lorton, Va., and garbage switched to this point and there disposed of by the reduction process and by feeding to hogs.

The present law permits the transportation by private individuals of table refuse to points outside of the District of Columbia to be fed to poultry and pigs. This license is being taken advantage of by a number of pig feeders and results in disadvantage to the District in that the garbage richest in fats is selected for this purpose and the city is left the lean garbage to collect, so that the production of grease has fallen off noticeably since this law went into effect. Specific recommendation is made in the estimates for this division that this law be changed.

The cost of this garbage service was considerably greater than when done under contract. This is to be accounted for by the scarcity and high cost of labor during the past year as well as by the low price received for the grease and tankage produced from January 1 to June 30. In order to operate the service as efficiently and economically as possible, it is necessary that the commissioners be given the authority to operate it as a business proposition. They should be permitted to buy or sell hogs, grease, and other products, and as the market dictated, without the formality and delay of taking bids.

CITY WASTES.

The service rendered by the contractor for the ash and refuse collection was seriously affected by the shortage of labor and the increased cost of both labor and material. It was soon apparent that the ash contractor would be unable to carry out his contract without great loss. The matter was brought to the attention of the Congress and an item of \$22,000 allowed by them for the adjustment of this contract in addition to his contract price of \$78,300.

The contract for the collection of miscellaneous refuse had been let to John G. Faircloth for a period of three years, beginning July 1, 1918. A plant for the separation and salvaging of this trash had been built in Virginia near the end of the highway bridge. This plant burned down in February, 1919, and following this the contract was assumed by the J. J. Whitehead Co., who have built and are now operating a new plant at Mount Olivet Road and Montello Avenue.

Congress has authorized the commissioners after July 1, 1919, to conduct as municipal functions the operations involved in the collection and disposal of city refuse of every kind. The ash service has been taken over and is now being performed by the District. This leaves but three such services still under contract, viz: The collection of miscellaneous refuse, the collection and disposal of dead animals, and the collection and disposal of night soil.

If the trash service is to be taken over by the District at the termination of the present contract, provision for this work should be made in the 1921 appropriation bill, so that on July 1, 1921, the District will be prepared with plant and equipment to carry on this work. Recommendation has been made for appropriation to buy sites and erect three new stables at points so located as to minimize hauling. The work of cleaning streets, collecting garbage, ashes, and trash should be coordinated in the interest of economy.

My acknowledgments are due to the employees of this division for the work accomplished by the office during the year.

Very respectfully,

MORRIS HACKER,
Supervisor, City Refuse.

To Capt. F. S. BESSON, U. S. A.,
Assistant to the Engineer Commissioner.

Cost of street cleaning for year 1918-19.

	Area.	Cost.	
		Total.	Unit per thousand.
Machine cleaning.....	218,682,000	\$77,555.50	\$0.351
Alley cleaning.....	57,205,000	45,118.53	.789
Suburban cleaning.....	32,876,000	29,500.42	.625
Hand patrol.....	718,112,000	195,665.33	.231
{ Lushing.....	17,752,000	7,176.21	.401
{ Squeezing.....	89,868,000	20,923.32	.233
Spinkling.....		5,252.02	
Sunday cleaning.....	3,895,000	395.73	.101
Dumpmen.....		5,503.99	
Property accounting.....		2,166.16	
Cot keeping.....		8.018	
Waste paper boxes.....		1,357.81	
Snow and ice.....		230.02	
Annual overhead.....		5,214.70	
Total.....		387,955.05	
*Washing total.....	748,112,000	223,770.89	.299

Yearly cost of cleaning by various methods.

Class of work.	Average thousand yards under attention.	Total cost.	Average cost for each thousand ya'ds under attention for year.	Thousand ya'ds cleaned.	Average number of cleanings for year.
Hand patrol ¹	3,668	\$195,665.33	\$53.35	748,142	204
Machine sweeping.....	1,790	77,555.50	43.33	218,682	122
Alley cleaning.....	1,173	45,118.53	38.47	57,208	49
Suburban streets.....	1,659	20,540.42	12.38	32,876	20
Squeezing.....	2,439	20,929.32	8.58	89,868	37
Flushing (horse and motor combined).....	534	7,176.24	13.44	17,752	33

¹ Hand patrol work is habitually in combination with squeezing and flushing.

Table showing comparative data in connection with street-cleaning work, 1915 to 1919.

SQUARE YARDS CLEANED.

	1915	1916	1917	1918	1919
Hand patrol.....	1,027,020,000	1,052,765,000	1,024,688,000	879,574,000	748,142,000
Machine sweeping.....	217,235,000	218,852,000	219,869,000	205,504,000	218,682,000
Alley cleaning.....	66,206,000	67,842,000	65,471,000	49,878,000	57,208,000
Suburban streets.....	43,549,000	50,127,000	58,940,000	38,333,000	32,876,000
Squeezing.....	167,754,000	187,794,000	169,566,000	125,520,000	89,868,000
Flushing.....	26,304,000	23,696,000	27,485,000	16,776,000	5,539,000
Motor flushing.....			6,135,000	12,621,000	12,213,000

Table showing comparative data in connection with street-cleaning work, 1915 to 1919—Continued.

DIRECT TOTAL COST.

Class of work.	Average thousand yards under attention.	Total cost.	Average cost for each thousand yards under attention for year.	Thousand yards cleaned.	Average number of cleanings for year.
Hand patrol.....	\$135,553.98	\$138,571.03	\$148,401.40	\$165,521.33	\$195,665.33
Machine sweeping.....	32,378.12	31,405.83	37,583.20	49,242.68	77,555.50
Alley cleaning.....	21,914.70	22,155.20	24,221.64	30,018.51	45,118.53
Suburban streets.....	14,269.23	15,900.32	20,164.21	18,986.48	20,540.42
Squeegeling.....	19,337.40	20,037.40	20,560.73	21,141.04	20,929.32
Flushing.....	5,099.30	5,033.32	7,829.54	7,566.84	2,757.68
Motor flushing.....			721.60	3,964.29	4,418.61

COST PER 1,000 SQUARE YARDS.

Hand patrol.....	\$0.132	\$0.132	\$0.145	\$0.189	\$0.261
Machine sweeping.....	.149	.144	.171	.239	.354
Alley cleaning.....	.331	.326	.371	.603	.789
Squeegeling.....	.115	.106	.121	.168	.625
Flushing.....	.194	.212	.285	.450	.497
Motor flushing.....				.314	.361

Total cost of street cleaning, including all charges, except interest on investment and depreciation..... \$387,985.05
 Population served..... 450,000
 Cost per capita per year..... \$0.862

Table showing comparative data in connection with disposal of all city wastes from 1915 to 1919.

NUMBER OF UNITS COLLECTED.

	1915	1916	1917	1918	1919
Garbage.....	50,806	52,207	44,683	48,874	53,258
Ashes.....	cubic yards	148,190	135,305	151,783	127,363
Miscellaneous refuse.....	do.....	146,152	157,180	149,810	163,291
Night soil.....	barrels.....	12,949	12,741	11,227	11,300
Dead animals.....	number.....	20,570	22,724	24,562	22,891

TOTAL NET COST.

Garbage.....	\$68,374	\$69,788	\$69,756.00	\$69,290.00	\$267,662.54
Ashes.....	73,041	68,935	59,052.00	68,922.64	100,300.00
Miscellaneous refuse.....	16,600	28,187	27,954.25	26,318.75	51,204.00
Night soil.....	14,996	14,990	14,994.00	14,998.00	17,500.00
Dead animals.....	2,855	2,988	2,988.00	2,988.00	3,360.00

LIQUIDATED DAMAGES DEDUCTED.

Ashes.....	\$109.00	\$65.00	\$948.00	\$1,077.35	
Miscellaneous refuse.....	391.00	213.00	445.75	2,081.25	\$2,796.00
Night soil.....	4.00	10.00	6.00	2.00	
Dead animals.....					

The table herewith gives a comparison of the number of complaints investigated by this division during the past two years:

	Ashes.			Refuse.				
	1918	Per cent.	1919	Per cent.	1918	Per cent.	1919	Per cent.
Complaints:								
Fault of contractor.....	1,633	57	1,386	43	1,504	53	4,671	76
Fault of householder.....	803	28	918	29	575	20	524	9
Doubtful.....	412	15	897	28	751	27	960	15
Total complaints.....	2,848	100	3,201	100	2,820	100	6,155	100
Total requests.....	237	.....	714	.....	223	.....	323	.....
Grand total.....	3,085	.....	3,915	.....	3,053	.....	6,478	.....

Miscellaneous data on contracts.

Class of waste,	Contractor,	Period of contract,	Date of expiration,	Price per annum,	Collected from—
Ashes	J. W. Bean Contracting Co.	1 year ..	June 30, 1919	\$78,300	Residencees, ^s in all boarding and lodging houses, small apartments.
Refuse.....	John G. Faircloth.....	3 years ..	June 30, 1921	{ ¹ 54,000 ² 35,400 ³ 15,000 }	Do.
Dead animals.....	Chas. F. Mann.....	5 years ..	June 30, 1923	3,300	Every part of the District.
Night soil.....	Warner Stutler.....	do.....	do.....	17,500	All privies in the District.

¹ First year.

² Second year.

³ Third year.

Statement showing total cost of garbage service.

COLLECTION SERVICE.

Cost of plant and equipment	\$35,110.00
Equipment purchased.....	28,219.41
Labor.....	140,313.57
Stock.....	29,867.42
Forage.....	28,461.67
Coal.....	1,110.00
Truck hire.....	33,379.85
Repairs to buildings.....	1,422.13
Paving yard at transfer station.....	14,348.22
Derrick hire.....	3,020.00
Livery.....	45.00
Freight, miscellaneous.....	8.01
Office pay roll.....	16,891.04
Miscellaneous expenses.....	6,990.37

Cost of collection service

339,186.69

REDUCTION SERVICE.

Cost of plant and equipment	\$49,890.00
Equipment purchased.....	13,413.41
Labor.....	85,069.51
Stock.....	49,518.54
Forage.....	374.25
Coal.....	21,740.66
Freight on coal.....	12,106.58
Freight, miscellaneous.....	876.76
Freight on garbage cars.....	20,560.48
Rent of garbage cars.....	7,374.60
Car repairs.....	2,621.20
Chemical analysis.....	406.98
Supervision.....	6,200.04
Repairs to railroad siding.....	1,949.78
Miscellaneous expenses.....	1,227.22

Cost of reduction service

273,330.01

REDUCTION SERVICE.

Value of grease July 1, 1918, to May 31, 1919.....	\$175,700.81
Estimated value for June, 1919, 194,620 net pounds.....	12,747.61

\$188,448.42

Total value of grease.....	40,306.55
Estimated value for June, 1919, 260 tons.....	1,534.00

Total value of tankage

41,840.55

Inventory June 30, 1919, original cost of plant and equipment July 1, 1918, \$49,890 less 10 per cent depreciation	\$44,901.00
Inventory June 30, 1919, equipment purchased, July 1, 1918, to June 30, 1919, \$13,413.41 less 10 per cent depreciation	12,072.00
Receipts and inventory of equipment on hand June 30, 1919	287,261.97
Total cost of reduction service July 1, 1918, to June 30, 1919	273,330.01
Profit, July 1, 1918, to June 30, 1919, of reduction service	13,931.96

COLLECTION SERVICE.

Total cost of collection service July 1, 1918, to June 30, 1919	339,186.69
Inventory June 30, 1919, original cost of plant and equipment July 1, 1918, \$35,110 less 10 per cent depreciation	\$31,599.00
Inventory June 30, 1919, equipment purchased, July 1, 1918, to June 30, 1919, \$28,219.41, less 10 per cent depreciation	25,397.47
	56,996.47
Net cost of collection service	282,190.22

HOG FEEDING.

Cost of hogs (200)	4,411.28
Stock purchased (material for pens, etc.)	\$909.89
Equipment (syringe)	1.25
Miscellaneous payments	431.37
Transfer vouchers	293.39
Hauling garbage to hogs	357.10
	1,993.00
Total cost of hogs, pens, labor, etc.	6,404.28
Inventory, June 30, 1919, hogs	\$7,000.00
Total cost of hogs, etc., June 30, 1919	6,404.28
Profit on feeding garbage to hogs	595.72

RECAPITULATION.

Net cost of collection service	282,190.22
Net profit on reduction service	\$13,931.96
Net profit on hog feeding service	595.72
	14,527.68
Net cost of entire garbage service from July 1, 1918, to June 30, 1919	267,662.54

REPORT OF INSPECTOR OF ASPHALTS AND CEMENTS.

WASHINGTON, D. C., August 15, 1919.

SIR: I have the honor to submit the following report showing the operations of this division during the fiscal year ended June 30, 1919. The volume of work of the division during the year was practically the same as during the preceding year, total number of samples tested being 9,347 against 9,358 during the year 1918.

ASPHALT PAVEMENTS.

During the year there were laid by the Cranford Paving Co., contractors for laying new asphalt pavements, approximately 45,270 square yards, in which Aztec, Bermudez, and Standard asphalts were used.

The Warner-Quinlan Co., contractors for repaving and resurfacing asphalt pavements, used Montezuma asphalt.

The municipal asphalt plant produced about 6,223 cubic yards of asphalt concrete and topping, used in the patching and repairs to asphalt pavements in which Aztec and Standard asphalts were used.

PORLTAND CEMENT.

Tested 7,757 samples, representing 77,611 barrels, of which 289 barrels were rejected. Results of tests and by whom submitted are shown in Table Nos. 7 and 8 accompanying.

During the year several new pieces of apparatus have been purchased and designed by the division, such as sieves, distilling apparatus, special thermometers, etc.

All work has been kept current and is current to date.

J. O. HARGROVE,

Inspector of Asphalts and Cements.

ASSISTANT TO THE ENGINEER COMMISSIONER.

Total number of samples tested.

Asphalts:	
Aztec	27
Bermudez	2
Montezuma	1
Standard	8
Asphalt mixtures:	
B'nder	14
Cement (binder)	156
Cement (topping)	164
Cement (District of Columbia asphalt plant)	227
Topping mixtures	392
C erete mixtures	11
Topping (old surface material)	10
Cement, Portland	7,757
Oils:	
Flux	1
Fuel	12
Road	14
Pitch, paving	3
Sands	328
Stone:	
B'nder	40
Limestone dust	3
Trap-rock screenings	2
Miscellaneous	175
Total	9,347

NOTE.—The results of the above tests are on file in this office subject to reference.

REPORT OF THE SURVEYOR.

WASHINGTON, D. C., August 26, 1919.

SIR: The following report of the work of this office is herewith submitted, including the condemnation of streets, avenues, and alleys, for the fiscal year ended June 30, 1919.

PRIVATE SURVEYS, OR SURVEYS FOR WHICH A FEE IS CHARGED.

During the first six months of the past year this work compared about evenly with that done during the duration of the war, but the amount of work very materially increased during the last six months of the year. With the office force not quite up to its prewar basis, it has been very difficult to keep the work current, some days as high as 50 orders for private work being received. This class of work must be done as soon as possible for the reason that operations of one kind or another are dependent upon the survey.

Inventory June 30, 1919, original cost of plant and equipment July 1, 1918, \$49,890 less 10 per cent depreciation	\$44,901.00
Inventory June 30, 1919, equipment purchased, July 1, 1918, to June 30, 1919, \$13,413.41 less 10 per cent depreciation	12,072.00
Receipts and inventory of equipment on hand June 30, 1919	287,261.97
Total cost of reduction service July 1, 1918, to June 30, 1919	273,330.01
Profit, July 1, 1918, to June 30, 1919, of reduction service	13,931.96

COLLECTION SERVICE.

Total cost of collection service July 1, 1918, to June 30, 1919	339,186.69
Inventory June 30, 1919, original cost of plant and equipment July 1, 1918, \$35,110 less 10 per cent depreciation	\$31,599.00
Inventory June 30, 1919, equipment purchased, July 1, 1918, to June 30, 1919, \$28,219.41, less 10 per cent depreciation	25,397.47
Net cost of collection service	56,996.47

The municipal asphalt plant produced about 6,223 cubic yards of asphalt concrete and topping, used in the patching and repairs to asphalt pavements in which Aztec and Standard asphalts were used.

PORTLAND CEMENT.

Tested 7,757 samples, representing 77,611 barrels, of which 289 barrels were rejected. Results of tests and by whom submitted are shown in Table Nos. 7 and 8 accompanying.

During the year several new pieces of apparatus have been purchased and designed by the division, such as sieves, distilling apparatus, special thermometers, etc.

All work has been kept current and is current to date.

J. O. HARGROVE,

Inspector of Asphalts and Cements.

ASSISTANT TO THE ENGINEER COMMISSIONER.

Total number of samples tested.

Asphalts:		
Aztec	27	
Bermudez	2	
Montezuma	1	
Standard	8	
Asphalt mixtures:		
B'nder	14	
Cement (binder)	156	
Cement (topping)	164	
Cement (District of Columbia asphalt plant)	227	
Topping mixtures	392	
C'ncrete mixtures	11	
Topping (old surface material)	10	
Cement, Portland	7,757	
Oils:		
Flux	1	
Fuel	12	
Road	14	
Pitch, paving	3	
Sands	328	
Stone:		
B'nder	40	
Limestone dust	3	
Trap-rock screenings	2	
Miscellaneous	175	
Total	9,347	

NOTE.—The results of the above tests are on file in this office subject to reference.

REPORT OF THE SURVEYOR.

WASHINGTON, D. C., August 26, 1919.

SIR: The following report of the work of this office is herewith submitted, including the condemnation of streets, avenues, and alleys, for the fiscal year ended June 30, 1919.

PRIVATE SURVEYS, OR SURVEYS FOR WHICH A FEE IS CHARGED.

During the first six months of the past year this work compared about evenly with that done during the duration of the war, but the amount of work very materially increased during the last six months of the year. With the office force not quite up to its prewar basis, it has been very difficult to keep the work current, some days as high as 50 orders for private work being received. This class of work must be done as soon as possible for the reason that operations of one kind or another are dependent upon the survey.

The number of orders left for work for the year ended June 30, 1918, was 2,200, as against 3,687 for the year ended June 30, 1919. The first six months of the past fiscal year 1,000 orders were received, while for the last six months 2,689 orders were received, this being more than double the number for the first six months and more than received during the entire preceding year. This is probably the record for the office.

The number of plats of various kinds made on the order of private parties for which a fee was charged was 3,348 against 1,850 for the preceding year.

All classes of work for the last six months of the past fiscal year showed a marked increase over that of the first six months, or of the entire preceding year. This was due to the great activity in building operations and the transfer of property throughout the District.

The total amount of money collected for this class of work, that is work done for private parties for which a fee is charged in accordance with schedule of fees fixed by the commissioners, amounted to \$16,456.30, against \$9,565.15 for the previous year. This shows an increase of about 73 per cent, most of which was received during the last six months.

Another class of surveys, and work not paid for, is that done for the Federal and District Governments. This work also has increased during the past year. A number of surveys were made for the Housing Corporation, the Walter Reed Hospital, and other departments of the Federal Government.

The total number of surveys made for the District of Columbia and private parties was 2,437, as compared with 1,372 for the previous year.

The following table is submitted as a matter of comparison and convenience, and will show the relation of the work for the past year with that of the previous year:

	Fiscal year 1917-18.	Fiscal year 1918-19.
FOR PRIVATE PARTIES		
Individual lots or parts of lots surveyed in city and county.....	2,576	1,850
Certificates of survey issued covering one or more lots.....	718	1,584
Duplicates of above recorded in survey certificate books.....	718	1,584
Separate surveys made to verify walls.....	518	694
Postal card reports concerning walls to owners.....	518	694
Individual buildings inspected as to location of new walls.....	1,060	1,044
Large tracts in county surveyed, subdivided, and recorded.....	6	6
Outline surveys in county of unsubdivided tracts.....	39	98
Subdivision plats prepared in duplicate.....	172	241
Duplicate subdivisions prepared for assessor.....	172	241
Subdivisions recorded.....	168	204
Total of individual new lots in subdivisions.....	2,262	1,480
Plats of one or more recorded lots to accompany applications for building permits (commonly called "building plats"), in duplicate.....	701	1,202
Plats made under regulations for theatres, stables, garages, etc.....	214	217
Estimates of cost issued in triplicate.....	2,200	3,687
Plats made up on order of private parties.....	1,850	3,348
Total of fees paid to collector of taxes by private parties.....	\$ 9,565.15	\$16,456.30
FOR THE DISTRICT OF COLUMBIA		
Surveys for the District of Columbia.....	91	55
Plats recorded (condemnations, dedications, etc.).....	56	28
Reports concerning walls to building inspector.....	533	694
Assessment and taxation plats recorded.....	130	225
MISCELLANEOUS		
Total of surveys for the District of Columbia and private parties.....	1,372	2,437
Total of plats, public and private, including plats drawn in books.....	3,315	5,396

STREET EXTENSIONS AND CONDEMNATIONS.

This class of work relates to the opening, widening, straightening, or extension of streets and alleys by condemnation, the preparation of plats for dedication, and the changing of the permanent system of highways plan in certain sections where deemed advisable in accordance with the procedure prescribed by law.

In all condemnation cases for the acquisition of land for streets and alleys, survey plats and descriptions are prepared by this office to be filed with the petition in court. Seven new cases have been filed during the past year, and three additional ones recommended by this office but not yet filed. Five cases have

been confirmed during the past year, and there are still 20 cases pending in court. The amount of damages allowed in the five cases confirmed was \$141,074.12, all of which is assessed against property benefited.

The following table will show the status of the cases now in court:

Condemnation cases.

STREET EXTENSIONS AND PARKS.

Location	Court docket No.	Case filed.	Verdict filed.	Verdict.		Remarks.
				Damages.	Benefits.	
Cathedral Avenue and Woodley Road; Wisconsin Avenue between Garfield Street and District line.	1239	Apr. 20, 1915	.....			Abandoned by act of Congress.
Building restriction line, Park Road and Mount Pleasant Street, square 2612.	1263	Feb. 4, 1916	Sept. 25, 1917	\$107,392.00	\$113,171.70	Mar. 4, 1919, verdict confirmed.
Building restriction line, Columbia Road, square 2536.	1277	May 9, 1916	Mar. 4, 1918	.....		July 11, 1918, motion of District of Columbia to confirm verdict.
Kenyon Street NW., Seventeenth Street to Mount Pleasant Street.	1279	Sept. 27, 1916	.....		
Shannon Place SE., square 5772.	1288	Nov. 28, 1916	Jan. 25, 1918	13,152.96	13,660.36	July 12, 1918, order confirming verdict; appeal noted.
Widening Benning Road west of Anacostia River.	1294	Mar. 13, 1917	.....			Continued from Feb. 1, 1919.
Highway and Park along Anacostia River, parcels 211/4 and 211/7.	1296	Mar. 26, 1917	.....			June 13, 1919, report of jury on assessment area; June 14, 1919, plat of assessment area submitted.
Building restriction line, Newton Street NW., between Sixteenth and Seventeenth Streets.	1297	.....do.....	.....			Continued from Apr. 12, 1917; verdict not yet filed.
Concord Avenue, between Fifth Street and New Hampshire Avenue; Riggs Road east of North Capitol Street; Kennedy Street, between Second Street and Concord Avenue; Longfellow Street, between Third Street and Concord Avenue.	1303	Apr. 14, 1917	.....		
Webster and Allison Streets between Arkansas Avenue and Fourteenth Street; Arkansas Avenue between Thirteenth and Sixteenth Streets; Fifty-sixth Street, between Van Ness Street and Massachusetts Avenue.	1311	Sept. 29, 1917	July 12, 1918	11,183.54	12,167.39	Oct. 29, 1918, verdict confirmed.
Dakota Avenue, from Vista Street to Bladensburg Road; Vista Street, from Franklin Street to South Dakota Avenue; Thirtieth Street, from Franklin Street to South Dakota Avenue.	1314	Jan. 30, 1918	.....			Continued to Sept. 20, 1919.
.....do.....	1315	May 6, 1919	2,011.98	2,383.00		June 30, 1919, verdict confirmed.
.....do.....	1316	June 13, 1918	7,333.64	7,838.91		Aug. 8, 1918, verdict confirmed.

Condemnation Cases—Continued.

STREET EXTENSIONS AND PARKS.

Location.	Court docket No.	Case filed.	Verdict filed.	Verdict.		Remarks.
				Damages.	Benefits.	
Montana Avenue NE, between Rhode Island Avenue and Bryan Street.	1317	do.....				Mar. 4, 1919, case dismissed by District of Columbia.
Fessenden Street NW, between Reno Road and Belt Road.	1318	do.....	June 25, 1919			Not yet confirmed.
Thirty-ninth Street NW, between Northampton Street and Chevy Chase Circle.	1326	May 29, 1918				
Small parks; Squares 1483, W-1556, N-3376, and 3340.	1370	June 20, 1919				
Seventeenth Street and Bryant Street NE, through parcels 143/15 and 154/9.						Apr. 28, 1919, commissioners' order and plats to corporation counsel.

ALLEYS.

Square 2571.....	1286	Nov. 22, 1916	.....	.....	.....	Not yet confirmed.
Squares 2831, 2842, 2685, and 3055.	1323	May 28, 1918	June 21, 1919	.....	.....
Squares 3572 and 3872.	1327	May 29, 1918	June 20, 1919	.....	.....	Do.
Square 5779.....	1339	Mar. 4, 1919	.....	.....	.....	Do.
Square 744.....	1343	Mar. 25, 1919	June 30, 1919	.....	.....	Do.
Square 2588.....	1352	Mar. 29, 1919	do.....	.....	.....	Do.
Square 1010.....	1367	June 9, 1919	.....	.....	.....
Squares 3561, 2061, 1053.	1368	do.....	.....	.....	.....
Square 2907.....	1369	do.....	.....	.....	.....	Feb. 26, 1919, commissioners' order and plats to corporation counsel.
Square 3937.....						May 17, 1919, commissioners' order and plats to corporation counsel.
Square 2206.....						

PARKS.

During the war the matter of parks has somewhat laid dormant on account of the pressing governmental activities in other matters; but there are few projects that deserve more serious consideration than the acquisition of park area. This is particularly true at this time when the city is growing rapidly and crowding into the undeveloped sections of the District, and destroying many places that should be preserved for all time for park purposes. Parks promote the health and happiness of the inhabitants of large cities, and there are tracts that should be preserved in the interest of the Washington of the future. The price is now low; it will not always be cheap. This undeveloped land is sparsely settled and citizens ride through it and use it for park purposes now; but the time is fast coming when it will not be available for this purpose. In fact, already many of these spots have been destroyed. In the federal plan of the original city, which included all that part of the city below Florida Avenue, ample provision was made for parks, but beyond this no provision has been made. This matter should be seriously considered before it is too late.

Those areas which would seem to demand immediate attention I submit in the following order:

1. Piney Branch Parkway, northeasterly from Sixteenth Street and Piney Branch. This would seem to be the first one which should have consideration,

for the reason that development is pushing in that direction so rapidly that this beautiful valley will soon be lost as a park.

2. Klingle Road Valley. This should extend from the southerly entrance to Rock Creek Park along Klingle Road Valley, crossing Woodley Road at about Thirty-first Street, connecting with Normanstone Drive, which lies northerly of Massachusetts Avenue extended and the Naval Observatory. This link would connect Rock Creek Park with the Rock Creek connection now in process of acquisition between Connecticut Avenue and the Potomac Park, and give a parkway around the Zoo Park, which can not be considered as open to the public at all hours.

This small link, if acquired, would make a continuous park from the southern limits of Potomac Park to the northern limits of the District, at the northern extremity of Rock Creek Park. There would be few such wonderful chains of parks in any city.

3. Mount Hamilton, situated between Bladensburg Road and the Eastern Branch. This has a beautiful elevation, well adapted for park purposes, and covered with a magnificent growth of trees, and is situated in the northeast section, which is not now well provided with parks.

4. Fort Drive connecting Rock Creek Park by way of Fort Stevens, Fort Totten, Fort Bunker Hill, and the Eastern Branch Park. This is part of a fort drive circling the entire city and connecting the various Civil War forts constructed for the defense of Washington. These forts are of historic interest, and in addition to providing a magnificent boulevard preserves many places of historic interest. Already two have been acquired east of the Eastern Branch, namely, Forts Davis and Dupont. This would make another link in this chain, and the reason for this particular link is that improvements are taking place very rapidly along this drive, making early action imperative if they are to be preserved.

5. Dean tract. The Dean tract is another tract of land recommended for use as a park by the Board of Trade. This would be quite desirable, but of course it is a very expensive parcel of land.

From time to time \$25,000 has been appropriated for the purchase of small parks in accordance with a map on file in this office. This is limited to small triangular spaces at the intersection of streets. The law restricted the commissioners to those indicated on the map on file in this office, and these have about been exhausted. The law should be changed so as to give the commissioners general authority to select those which in their judgment are suitable.

HIGHWAY PLAN.

In accordance with the present law the commissioners have authority to open by condemnation any street in accordance with the highway plan. This authority has been exercised in cases where in the judgment of the commissioners it was deemed in the public interests. The law provides that the entire cost shall be assessed as benefits. There are many cases where, if this authority were exercised and the entire cost assessed, the proceeding would amount practically to a confiscation of the property benefited. Either there should be a general law authorizing the commissioners to institute condemnation proceedings whenever in their judgment the public interests require it, and allow the jury to assess a percentage of the cost against the property benefited, or there should be a law for each specific case. I would prefer the first plan if that could be secured.

In connection with the condemnation of streets the last District appropriation act only allowed \$40,000 for this purpose. This will interfere with this work, and some of the important cases can not be handled for the reason that the cost will exceed the limit fixed by law, as would have been the case in the widening of Wisconsin Avenue, the damages in that case amounting to about \$107,000. This provision should be repealed and the commissioners given the same authority that they have always enjoyed, and which I am sure has never been abused.

ALLEYS.

An act approved September 25, 1914, known as the "alley law," was suspended by public act No. 156, approved May 23, 1918, for one year following the ratification of the treaty of peace. The same steps should be taken to

amend the original act. With the present crowded housing condition in the District of Columbia, nothing should be done to increase that condition. To drive some eight or ten thousand people now in alley houses out of those houses would seriously increase the present overcrowded condition. This office will be glad to prepare a bill covering this matter if the commissioners so direct. This office believes a number of amendments should be made to the present law.

The appropriation of \$1,000 for the acquisition of land for alleys has been put to good advantage in acquiring small cut-offs.

At the present time many garages are being built to accommodate the great number of automobiles owned in the city. A permit can not be secured for the erection of these garages unless it is shown that they are erected on a lot or a parcel of ground surveyed. It is believed that the present regulations affecting subdivisions, which provide that a lot shall not contain less than 800 square feet or abut on an alley when practicable, should be changed so that small lots for garages can be created. This would be a benefit to the building inspector's office and many other offices in the District government, besides being a great benefit in the transfer of these garages to private owners, as this has to be done now by cumbersome metes and bounds descriptions.

A number of men who were in the service have returned to the office, and some are yet to return. During the year cheerful cooperation and help has been given by all of the members of the office; but in this connection I wish to emphasize the recommendations in the annual estimates for an increase in the pay of the men in this office.

Very respectfully,

MELVIN C. HAZEN,
Surveyor, District of Columbia.

ASSISTANT TO THE ENGINEER COMMISSIONER.

REPORT OF THE SUPERINTENDENT OF TREES AND PARKINGS.

WASHINGTON, D. C., August 20, 1919.

SIR: I have the honor to submit my third annual report dealing with the operations of the trees and parkings office for the fiscal year ended June 30, 1919.

TREES PLANTED, REMOVED, AND SPRAYED.

The systematic planting of young trees to their permanent positions on the streets has always been the most important feature of our work. I regret to state that in the past two years we have fallen behind in the work due to the extraordinary difficulties arising from adverse conditions created by war. Labor has been exceedingly scarce, and as a result there are many vacant tree spaces in the established lines of trees and also many improved streets where trees should be planted. We have at this time 3,021 tree holes listed for digging and planting, and it is the intention to make an extra effort during the present year to plant trees at these locations. No tree holes were prepared for planting during last fall. Labor conditions having improved somewhat during the late winter and early spring, an effort was made to plant a few trees. Our effort during the spring resulted in the transplanting of 758 young trees to their permanent position on the streets. Of the number planted 752 were set at the curb line, 5 in the parking between the inner edge of the sidewalk and the building line, and 1 in the center parking of Fourteenth Street NW., north of Montague Street. A decrease of 742 trees is noted in this work as against last year's record, which was 1,500 trees, and this was an unusually small planting for any one fiscal year.

Many fine trees necessarily fall a sacrifice to important street improvements throughout the city, from the mutilation of roots, the resetting of curb and laying of sidewalks, and laying of sewer and water pipes. It is the desire of this department to see that the total number of trees in the city does not diminish. Hundreds of trees die annually because of injuries over which this department has no control but has to bear the blame. Added to natural enemies, the unfavorable city conditions make the life of a street tree a hard one and it seems

idle to plant trees unless their safety can be assured. The chief sources of injury to shade trees are the general poor condition of the soil along the streets, which is continually being impoverished by the growing tree and our inability to fertilize them because of the cement walks and pavements. Salt water which is used in the making of ice cream is responsible for the death of a great many trees. The oiling of roadways, I believe, is injurious to shade trees. I recently observed a prominent street where auto traffic was heavy and had recently been oiled, and within two weeks the leaves of fine rows of trees had dried and had every appearance of early falling. The dust laden with oil clogs the breathing pores on the leaves and I believe seriously injures them. Illuminating gas is responsible for the death of and serious injury to many fine trees. I believe the old system of calking pipes is not the proper method along streets where the heavy vibration from the cars loosens the joints. During the year 1,233 trees were removed for various reasons. There was a decrease of 654 trees over the number removed the previous year.

The spraying of all trees on the streets, with the exception of Carolina poplars, gingkos, tulip poplars, and honey locust with arsenate of lead, for extermination of leaf-eating insects, was in progress at the beginning of the fiscal year and was continued up to and including August 24, 1918. The leaf-eating insects at this time had about all disappeared. Street trees are especially liable to damage by insects and on May 5, 1919, spraying operations were resumed, and continued up to the close of the year. The elm trees throughout the city were sprayed first to prevent their defoliation by the elm-leaf beetle. Immediately after all trees of this variety had been sprayed, the lindens were given attention. The foliage on these varieties are almost free of insects and in fine condition at this time. I am quite sure that had spraying operations been deferred until the insects made their appearance the foliage would have been devoured before all trees infested could have been sprayed. Immediately after the work of spraying the elms and lindens had been completed the past spring, this office undertook to spray all other trees on public space. At the close of the fiscal year nearly all trees in the northwest section south of Florida Avenue and west from North Capitol Street to Rock Creek had been sprayed.

The following statement shows the number and varieties of trees planted, removed, and sprayed during the year:

Variety.	Planted.	Removed.	Sprayed.
Ash.....		3	298
Catalpa.....		1	
Chestnut.....		13	
Chestnut, horse.....		3	212
Elm.....	62	45	16,556
Gingko.....	32	22	
Gum, weet.....			69
Linden.....	3	61	9,887
Loupe;			
Honey.....		7	
Yellow.....		4	
Mulberry;			
Norway.....	180	195	6,102
Red.....		5	626
Silver.....		165	14,495
Sugarc.....	21	114	1,867
Sycamore.....	1		78
Mulberry.....		3	
Negundo.....		9	229
Oak;			
Pin.....	227	111	1,594
Red.....	148	107	759
White.....		7	
Willow leaf.....	8		
Orange.....		1	
Pine.....		4	
Pine;			
Green.....		6	
Westernian.....		8	
Carolina.....		42	
Tulip.....		5	336
Sassafras.....		1	
Sassafras, S. munt.....		1	
Sycamore, i. e. oriental plane.....	76	287	8,278
Total.....	758	1,233	61,386

The planting, removal, and spraying of the above trees was paid for as designated below:

	Streets, District of Columbia, 1919, park- ing com- mission.	Appropri- ations for other de- partments.	Whole cost deposits.
Planting.....	748		10
Removing.....	1,185	28	20
Spraying.....	61,386		

Of the 1,233 trees removed during the year, 73 were dead, decayed, and dangerous; 9 were of inferior and condemned varieties; 30 to relieve excessive shade; 33 because of street improvements; 15 for driveways; 4 improvements of alleys; 39 accidents; 98 storms; 2 injurious to private property; 6 close proximity to buildings; 3 to accommodate lamps; 8 entrances to buildings; 2 parking improvements.

It was ascertained that 33 trees were destroyed by illuminating gas, 33 by salt water, 81 by abnormal moisture supply, 13 by being girdled, 20 by being filled around, 203 by drought, 57 by insects, scale, borers, sycamore louse, etc., 2 by gasoline, 11 by root mutilation, 4 by frost, and the deaths of 454 were unexplained.

Of the number removed, 1,115 stood at the curb line, 86 in the parkings, 11 in the sidewalk, 5 in the roadways, 14 in alleys, and 2 in playgrounds.

NURSERIES.

During the year this department had a most serious setback due to no fault of our own. Two nurseries well stocked with trees containing about 30 acres of ground was taken from us, one by the Housing Corporation and the other for the Gallinger Hospital, and no permanent provision has been made for a nursery up to this time. The Chief of Engineers, United States Army, granted us permission, revocable at will, to occupy a small piece of ground, known as Fort Dupont, containing about 16 acres. Only 4 acres on the tract has been cleared and we are forbidden to clear any more ground. Nearly all employees with our own teams accomplished the transfer of fencing, one building, and approximately 5,000 trees from the municipal nursery located at the intersection of Iowa Avenue and Webster Street, NW., to the new site, after preparing the recently acquired ground, repairing certain buildings, and building a road. This work was started in October and finished in March at an expense of approximately \$10,000. The scarcity of labor and the constant changes in the personnel of the gangs and the great amount of preparation required on this unimproved ground made the transfer a very difficult matter at the time, and, of course, made it necessary to discontinue nearly all other outside work until it was completed. It is the desire of this office to have this site transferred permanently to this department. If this transfer is not made I can not imagine what will be done for trees in the coming years. A nursery is an immediate need, as seed must be sowed each year so as to enable us to have trees coming all the time.

TRIMMING.

During the year all trees in the entire southwest section of the city were trimmed. In the area covered by this treatment all trees were cleared of dead, low, and other objectionable branches, with the result that they were much improved in appearance. Owing to the scarcity of labor, it was not practicable, without neglecting other urgent work, to cover more territory than this, but it is a matter of growing importance that all of the large trees should receive this attention annually. The silver maples are responsible for the largest outlay in trimming, this variety being planted years ago to the exclusion of many kinds whose subsequent use has proved more advantageous. This tree, as a street variety, is noted for the early decay of its branches and requires close attention to keep it in proper condition. In addition to the above, the "floating gang" accomplished much trimming on individual requests. If trees

planted along the street are to become symmetrical and strong, it is necessary to prune and train them. The most important pruning is required at the time of transplanting. It is then a tree is trimmed up and trained accordingly to its condition at the time, the characteristic style and method of growth, and type of head which is desired. Unless cared for, trees acquire a greater or less amount of deadwood. In the struggle for existence many branches fall out of the race. When crowded, trees prune themselves, lower limbs often die from the shade of higher branches. Insects and fungous diseases, mechanical injuries, winter killing of the roots and crown, lack of mineral food and moisture, and other causes play a part in the formation of deadwood. Whatever the cause, dead limbs must not be neglected. A total of 11,735 trees were trimmed during the year.

TREE SURGERY.

Where, for any reason, a wound exists, and the inner wood is exposed, the cambium at once attempts to cover it. This is brought about by a sort of rolling of the cambium out over the exposed wood. This growth of callous takes place mostly from the side and upper part of the wound, owing to the downward flow of the sap. Whenever a dead branch, or even the stub of one, remains upon a tree, the cambium vainly endeavors to heal the wound, although nothing can be accomplished. The new bark may protrude an inch or two along the branch, but farther it can not go. This condition is to be seen on every hand, and on a beautiful old tree it is pathetic. If the limb is not removed at this stage, decay eats back into the trunk, and by the time the stub has rotted sufficiently to fall of its own accord an ugly cavity has formed in the trunk. A cavity in a tree is really a serious matter. Even a small fissure on one of the upper branches may kill a tree in time, owing to the spreading of the decay from one branch to another and finally down into the trunk. It is impossible for the bark to heal over a large cavity, as there is no support for the cambium to roll on. Such a cavity will rapidly increase in size until the entire trunk is hollow, and the tree goes down under its own weight or before a strong wind. It is necessary that some surface should be present on which the cambium may roll. The cavity should also be filled in order to make the tree sound once more, and this must be done in such a way that the decay is permanently checked and the trouble remedied for all times. All decayed and diseased tissues must be removed from a cavity until nothing but sound wood remains. A heavy application of coal tar is applied to the interior, and the cavity is then filled with cement. Considerable skill is required to do expert work of this kind, and the filling of a decayed tooth by a dentist requires no more care than the proper treatment of a cavity in a valuable tree. The cavities in 321 trees were treated. The following shows the location, kind, and number of trees cemented:

Kind.	Curb.	Parking.
Elm.....	1	.....
Linden.....	255	61
Maple:		
Red.....	1	.....
Silver.....	3	.....
Total.....	250	61

CULTIVATING YOUNG TREES, MOWING PARKINGS, AND REMOVING TREE BOXES.

At the beginning of the fiscal year nearly all the force was engaged in the mowing of weeds on parkings abutting unimproved property, also the cultivation of all young trees throughout the city; this work was carried on until the entire tree-planted streets had received this attention. It is deemed necessary to rid the city of as many weeds as possible. An overgrowth of weeds on the parkings and in the tree spaces throughout the city spoils the good appearance of a street, and many complaints are received each year before the entire city can be covered, especially in the outlying districts.

Few persons realize that it is necessary to cultivate recently planted trees after they have been transplanted to their permanent position on a street. This, however, is very important. Grass should not be allowed to grow around the base of a young tree for the first few years after planting. Keeping the top soil loose by cultivating it at intervals increases its capacity for taking in moisture, checks evaporation, and promotes growth. More trees suffer from starvation than anything else. On lawns as on sidewalks a tree's natural food (fallen leaves, etc.) is taken away, water is denied, and both rain and air are excluded by close pavement, or by sod. The consequent weakened condition induces disease and insect attack. After last spring's planting had been completed, the work of again cultivating all small trees and removing dirt from recently planted trees throughout the city was undertaken, and this work had been completed at the close of the year. The young trees having all received the usual spring cultivation, we undertook the work of removing weeds and undergrowth from the public space abutting unimproved private property, and this work will receive our attention until the entire city is again covered.

A total of 960 wooden tree boxes and iron tree guards were removed during the year from trees which no longer required their protection. The wooden tree boxes can not be used again. The iron guards removed will be painted and can be used on other small trees requiring protection.

REGULATION OF TERRACES.

This office examined and issued 415 permits affecting terraces during the year. The regulation of terraces throughout the city is proceeding satisfactorily, and this office has had very little trouble with the builders regarding the proper treatment of the parking.

About the last of May just past, this office was relieved of the duty of passing on applications for the erection of fences, wickets, etc., planting hedges, and constructing cement copings on public space. These duties were transferred to the permit clerk, District of Columbia.

PAVING OF ABANDONED TREE SPACES.

The work of paving abandoned tree spaces throughout the city during the year was performed by the surface division, engineer department, and the cost of the work paid from the appropriation for the parking commission. A total of \$470.29 was spent on this work.

SUMMARY.

Curb trees on streets at close of fiscal year 1918	104,617
Net decrease of curb trees during the fiscal year 1919	363
Curb trees on streets at close of fiscal year 1919	104,254
Mileage of trees at close of fiscal year 1918	594.42
Decrease of mileage of trees, fiscal year 1919	2.06
Mileage of trees at close of fiscal year 1919	592.36
Mileage of tree-planted streets at close of fiscal year 1918	297.21
Decrease of mileage of tree-planted streets at close of fiscal year 1919	1.03
Mileage of tree-planted streets at close of fiscal year 1919	296.18

NOTE.—Mileage is figured on the basis of 352 trees to the mile.

APPROPRIATIONS.

By appropriation "Streets, District of Columbia, 1919, parking commission"	\$60,000.00
By repayment to above appropriation	2,716.33
Total	62,716.33

Labor	\$46,796.20
Materials	12,004.33
Charges against appropriation	3,449.20
To balance of above appropriation, unexpended	466.60
Total	<u><u>62,716.33</u></u>

Expenditures from miscellaneous appropriations, exclusive of parking commission 2,716.33

I wish to record my appreciation of the employees of the department, who have worked faithfully and efficiently during the year.

Very respectfully,

C. LANHAM,

Superintendent of Trees and Parkings, District of Columbia.

ASSISTANT TO THE ENGINEER COMMISSIONER.

REPORT OF THE SUPERINTENDENT OF THE MUNICIPAL GARAGE.

WASHINGTON, D. C., August 21, 1919.

Sir: I have the honor to submit the following report on the "Care and maintenance of automobiles in the municipal garage."

For the fiscal year ending June 30, 1919, this department maintained and kept in running condition 41 automobiles for the various departments of the District government.

This garage has necessarily kept open day and night during the entire year, some of the automobiles being pressed into service at night. All machines were washed, supplied with oil and gas by the night force, who also served as watchmen.

The laboring force consisted of eight men, keeping the machines in repair, maintaining them, and driving for departments which did not have automobiles or drivers allotted to their respective departments.

A battery-charging outfit has been installed, which is sufficient to take care of all the batteries used by machines in the garage.

The total running expense on these cars for gas, oil, tires, and miscellaneous supplies, amounted to \$11,548.63, or an average of \$66.03 for each car, or \$0.0483 per mile.

Repair parts amounted to \$2,707.40, or an average of \$66.03 for each car, or \$0.0113 per mile.

Average mileage for each car traveled was 5,946 miles.

A. E. REIGELMAN,

Superintendent Municipal Garage.

ASSISTANT TO ENGINEER COMMISSIONER.

REPORT OF THE ASSISTANT ENGINEER COMMISSIONER.

OFFICE OF THE ENGINEER COMMISSIONER

OF THE DISTRICT OF COLUMBIA,

Washington, D. C., October 10, 1919.

SIR: I have the honor to transmit herewith annual reports giving in detail the operations during the fiscal year ended June 30, 1919, of the various divisions and offices under my supervision since March 10, 1919, I having taken over on that date certain of the duties previously assigned to Col. J. J. Loving, assistant to the Engineer Commissioner.

Very respectfully,

CAREY H. BROWN,

*Captain, Engineers, United States Army,
Assistant to the Engineer Commissioner.*

To the ENGINEER COMMISSIONER.

REPORT OF THE SUPERINTENDENT OF THE WATER DEPARTMENT.

SEPTEMBER 6, 1919.

SIR: The annual report of the water department for the fiscal year ended June 30, 1919, is herewith submitted:

The mean daily consumption for the year was 64,428,356 gallons, while for the year ended June 30, 1918, it was 59,606,970 gallons, showing an increase of practically 5,000,000 gallons per day for this year.

In my report for last year a method was outlined for an equitable arrangement for payment for water used and to prevent its waste by Government and District departments by charging said departments for all water used. Evidently this idea was not acceptable to Congress. When, however, it is brought to the attention of Congress that only 50 per cent of the water used in the District is paid for, it would appear to the fair-minded that Congress would not allow such a state of affairs to exist and would insist upon a plan whereby everyone who used water would pay for it, especially when it appears, from the best sources available, that the relative amounts invested in the construction of the water distribution system of the District of Columbia are as follows:

Paid by United States Government-----	\$7,561,009.10
Paid by the District government-----	3,601,264.30
Paid by the water department-----	9,230,211.56

Total----- 20,392,484.96

The above statement shows that the United States is not the largest contributor to the construction end of the water system, and when it is further shown that Congress has appropriated from water department funds during the years 1917, 1918, and 1919 the sum of \$537,600 for the upkeep of the Aqueduct and filtration plants (thereby taking this sum which was absolutely necessary for extension of trunk mains for our second and third high services) it will or should see that a more equitable arrangement is made for payment for water used by both the United States and District Governments. I am of the opinion that everyone who has to pay for water will take more interest in looking into and preventing its waste.

Water pumped.

Service.	Fiscal year 1918-19.	Fiscal yea 1917-18.
First high (city).....	Gallons. 7,139,192,000	Gallons. 7,003,710,000
Second high (city).....	3,195,88,990	2,836,902,870
Third high (city).....	912,226,400	804,444,200
Fourth high (city).....	98,682,115	108,272,624
First high (Anacostia).....	118,688,400	125,615,300
Second high (Anacostia).....	11,591,560	10,944,886

No estimate was submitted for the covering of Brightwood Reservoir, owing to the fact that if certain plans for increasing the water supply of the District of Columbia are carried out the elevation of the second high service lines will be changed. This change will possibly lead to the abandonment of this reservoir.

The total length of mains laid for this fiscal year is 47,688 feet, or 9.03 miles, making the length of mains in service 633.1 miles.

Reports of the divisions of this department, in detail, are herewith submitted.

Very little has been done during this year toward the completion of metering the water services of the District of Columbia owing to the high cost of meters and lack of funds. There were installed only 394 meters during the year. The percentage of metered services is 86.

I wish to record my appreciation of the work done by the employees of the department.

J. S. GARLAND,
Superintendent Water Department.

ASSISTANT TO THE ENGINEER COMMISSIONER.

ENGINEERING AND CONSTRUCTION.

SIR: I respectfully submit the following report of work done by division "D," engineering, construction, plans, estimates, tests, telephone switchboard, and records for the fiscal year ended June 30, 1919:

Work was completed on the extension of a 24-inch trunk water main in Twenty-first Street NW., southward from L Street to territory west of Seventeenth and north of B Street NW., in which numerous frame buildings for United States Government purposes have been erected. This water main was necessary to improve the water service for fire and domestic purposes in the area affected.

A 12-inch water main was laid in Sixteenth Street and Alaska Avenue north from Military Road to better serve the territory north of Brightwood and the Walter Reed General Hospital, which have been supplied heretofore by a single line of 12-inch main.

In Missouri Avenue from Four-and-a-half Street to Sixth Street, a 20-inch main was laid for reinforcement and fire protection purposes for the new office buildings erected for the United States Government between B Street NW. and B Street SW. and between Four-and-a-half and Seventh Streets. This main is a direct connection between the 30-inch trunk main in Four-and-a-half Street and the 12-inch main in Sixth Street.

The laying of 12-inch water mains in Sixth and Seventh Streets between B Street north and B Street south and through the Smithsonian Grounds from Seventh to Ninth Streets were completed and put in service for fire and domestic purposes for new buildings erected by the United States Government in this section.

Due to the construction of a bridge over the railroad tracks at Benning Station to eliminate a grade crossing it was necessary to remove and re-lay on an offset line about 800 feet of 16-inch water main.

(For detailed report see reports of Messrs. Fitzgerald, Hebbard, Lay, Yates, Woodward, and chief operator of the pumping station.)

D. W. HOLTON, *Engineer.*

The SUPERINTENDENT OF THE WATER DEPARTMENT.

Sir: I respectfully report that the following work was completed during the fiscal year beginning July 1, 1918, and ending June 30, 1919:

Number of mains laid:		Number of mains laid—Contd.	
24-inch	2	4-inch	1
20-inch	2	2-inch	1
16-inch	2	1½-inch	2
12-inch	13		
8-inch	64	Total	87

Mains laid in place of old:

- 24-inch (substitute for 6-inch) E Street, between Seventeenth and Eighteenth Streets NW.
- 20-inch (substitute for 8-inch) Twentieth Street, between New York and Virginia Avenues NW.
- 12-inch (substitute for 8-inch) Twentieth Street, between B Street and Virginia Avenue NW.
- 8-inch (substitute for 6-inch) Seventeenth Street, between Pennsylvania Avenue and H Street NW.
- 8-inch (substitute for 4-inch) D Street, west from Ninth Street SW.
- 8-inch (substitute for 6-inch) Ninth Street, north from Mount Vernon Place NW.

Mains lowered:

- 8-inch, Q Street, between Twenty-fifth and Twenty-sixth Streets SE.
- 8-inch, Park Place, east and west of Twenty-fifth Street SE.
- 8-inch, Twenty-fifth Street, south from Park Place SE.
- 6-inch, Thirteenth Street, between Franklin and Girard Streets NE.
- 8-inch, Kennedy Street, between First Place and First Street NW.
- 8-inch, Sixteenth Street, north from H Street SE.
- 6-inch, Woodley Road, east and west from Thirty-eighth Street NW.
- 6 and 8 inch, Thirty-eighth Street, north and south from Woodley Road NW.
- 8-inch, Concord Avenue, between New Hampshire Avenue and North Capitol Street NW.

Valves installed:

24-inch, 2-way	2	12-inch, 2-way	2
20-inch, 2-way	3	8-inch, 2-way	9
16-inch, 2-way	2	6-inch, 2-way	16
12-inch, 2-way	20	4-inch, 2-way	30
8-inch, 2-way	112	3-inch, 2-way	4
6-inch, 2-way	58	2-inch, 2-way	1
4-inch, 2-way	47	6-inch, 3-stem	3
3-inch, 2-way	25	6-inch, 4-stem	3
2½-inch, 2-way	1	6-inch, 4-stem (8-inch bells)	1
2-inch, 2-way	19	4-inch, single stem	1
1½-inch, 2-way	2		
1¼-inch, 2-way	2	Total	70
6-inch, 3-stem	9		
6-inch, 3-stem (8-inch bells)	9		
6-inch, 4-stem	6		
6-inch, 4-stem (8-inch bells)	7		
Total	324		

Valve casings installed	253
Buffalo boxes installed	34
Valve casings removed	44
Buffalo boxes removed	6
Valve casings installed in place of old	8
Buffalo boxes adjusted	10
Valve casings adjusted	10
Valve casings installed in place of Buffalo boxes	5
Fire hydrants erected (new in place of old, 41)	111
Fire hydrants removed	49
Fire hydrants adjusted	14
Fire hydrants paved around	83
Street hydrants paved around	22

Horse fountains paved around	4
Paved cuts on account of leaks	18
Sodded cuts on account of leaks	13
Paved cuts over new mains	4
Sodded cuts over new mains	2
Paved cuts over service pipes	2
Number of connections (3 to 6 inches) to buildings	36

MISCELLANEOUS.

Removed the 12-inch main (temporary) in Vista Street between Franklin Street and South Dakota Avenue NE.

Changed location of 6-inch meter at Corby's plant.

Offset 6-inch main over steam tunnel at Thirteenth and B Streets NW.

Lowered 6-inch main in front of No. 1770 Massachusetts Avenue NW.

Removed and replaced 16-inch main in Benning Road east and west of Kenilworth Avenue NE.

Repaired brick vault over 24-inch valve at Sixth and R Streets NW.

Repaired broken 24-inch main at Eleventh and S Streets NW.

Removed 8 by 4-inch tee and capped main at Nineteenth and B Streets NW.

Removed 20 by 6 inch saddle and valve from main in Fourteenth Street north from B Street NW.

Changed location of post indicator valve in Twentieth Street between B and C Streets NW.

Laid 2-inch service in Alabama Avenue, between Stanton Road and Thomas Street SE.

Laid 1½-inch service in Jasper Road and T Street Hill SE.

Laid 2-inch service in Stanton Road west from Alabama Avenue SE.

JOHN E. FITZGERALD, *Foreman.*

To the SUPERINTENDENT WATER DEPARTMENT.

MISCELLANEOUS ENGINEERING.

SIR: I report that the following work was done for the fiscal year beginning July 1, 1918, and ending June 30, 1919:

Surveys for—

New mains (levels necessary on 69)	89
Lowering mains	9
Water department connections	4
Private connections	15
Meters and vaults	1
New location of old fire hydrant	2
New fire hydrant in place of old	41
New fire hydrant in new location	70
1-inch drains from old fire hydrants	1
Adjustments of fire hydrants	14
New valves	5
New public hydrants	2
New blow-offs	2
Preliminary surveys for water mains, etc.	21
Preliminary levels for water mains, etc.	75
Mains restaked	8
Investigations of pressure complaints	3
Fire hydrant elevations established	87
Fire hydrant pressures taken	96
Permits requested for fire hydrant drains	40
Notifications to sewer department for inspector for drain	40
Miscellaneous locations	43
Completed notes turned in	222
Visits to work in progress	698

Weekly charts of pressures were collected from four recording gauges during the spring and summer months.

Pressures were taken bimonthly on 45 fire hydrants scattered throughout the district.

New fire hydrant index cards were made for all new fire hydrants during the year.

The following gravity trunk mains were laid and put into service. The 24-inch mains in B Street between Seventeenth and Twenty-first Streets NW., Twenty-first Street between B Street and New York Avenue NW., and E Street between Seventeenth and Eighteenth Streets NW. The 20-inch mains in Twentieth Street between Virginia and New York Avenues NW. and Missouri Avenue between Four-and-a-half and Sixth Streets NW. The 16-inch main in B Street between Twenty-first and Twenty-third Streets NW. and the 12-inch main in Government Reservation between Seventh and Ninth Streets, and B Street NW., and B Street SW. These mains were made necessary on account of the erection of several new Government buildings in the above-mentioned territory.

The 16-inch main in Benning Road east from Anacostia Road NE. was removed and relaid in a new location in order that a new concrete viaduct might be constructed over the present railroad tracks.

The 12-inch third high service in Sixteenth Street between Military Road and Alaska Avenue NW. and in Alaska Avenue between Sixteenth and Elder Streets NW. was laid and put in service. This main was laid for the purpose of giving Walter Reed Hospital a sufficient amount of water. It also eliminates the isolation of Takoma Park, D. C., which heretofore had only one main supply.

The 12-inch third high service main in Van Ness Street west from Connecticut Avenue NW. was laid and put in service. This main was laid in order to supply the new Bureau of Standards building with water.

RALPH L. HEBBARD,
Assistant Engineer.

THE SUPERINTENDENT OF THE WATER DEPARTMENT.

SIR: I submit herewith the report of work done under my charge during the fiscal year ended June 30, 1919, as embodied in the reports of Mr. H. D. Yates, in charge of subdivision "tests and experiments" and Mr. H. M. Dante, in charge of subdivision, "plans, estimates, and miscellaneous drafting."

A. S. LAY, Assistant Engineer.

THE SUPERINTENDENT OF THE WATER DEPARTMENT.

MISCELLANEOUS DRAFTING.

Drawings and tracings made.....	62
Projects made.....	81
Files forwarded to assessor.....	81
Cards forwarded to assessor.....	129
Posting of maps and tracings.....	680
Valve notes posted on intersection cards.....	390
Communications, reports, etc., written.....	1,062
Permits passed.....	605
Intersection cards made.....	67
Locations of water mains given out.....	1,216
Water pressures given out.....	141
Connection cards for registrar.....	24

Posted, daily, 50, 100, and 300 foot scale water main maps, and map tracings; posted, daily, the work in progress; worked on cards showing mains, valves, etc., at street intersections; worked on valve index; passed schedules of work to be done under the commissioners' orders; passed schedules of work to be done by the surface division; passed permits for terraces, copings, and driveways; miscellaneous lettering, estimates, reports, and general office work.

H. M. DANTE, Clerk in Charge.

TO ASSISTANT ENGINEER, WATER DEPARTMENT.

TESTS AND EXPERIMENTS.

SIR: I submit the following report of the work done under my charge during the fiscal year ended June 30, 1919:

The subdivision of "tests and experiments" is charged with testing and correcting the measuring apparatus used by the department; with making accuracy

tests of all water meters to be used in the District of Columbia; with purifying the oil removed by the waste-cleaning machine; with collecting samples of coal deliveries; with making special tests of boilers and machinery as called for; with figuring the daily pumpage, consumption, station duty, etc., and with keeping necessary records.

Special tests made during the year include official duty trials of the 5,000,000 gallon De Laval centrifugal pumping unit installed in 1917, and accuracy tests on large-sized water meters by means of weir measurements. Although several changes have been made in the design of the pumping unit, the builders have not as yet been able to secure the guaranteed duty.

Miscellaneous tests made include the following: Water meters, $\frac{1}{2}$ to 8 inch sizes, tests for accuracy, 11,863; valves, $\frac{1}{2}$ to 20 inch sizes, tests for leaks, 482; corporation cocks, $\frac{1}{2}$ to 2 inch sizes, tests for leaks, 682; curb cocks, $\frac{1}{2}$ to 1 inch sizes, tests for leaks, 504; fire hydrants, examined and tested, 5; and pressure gauges tested and corrected, 34. Also made tests of recording pressure gauges and thermometers; accuracy tests of automatic measuring tanks; accuracy tests of recording V-notch flow meters; set up recording pressure gauges on fire hydrants; tested and adjusted pressure regulator valves; repaired clock movements, and overhauled other testing and measuring apparatus installed in the pumping station.

The 1,500 $\frac{1}{2}$ -inch Worthington water meters furnished under contract during the year included 1,420 accepted "as received," and 80 rejected on account of inaccuracy. The inaccurate meters were repaired in the department's shops.

Tests of private and municipal water meters (excluding meters on endurance test) during the fiscal year ended June 30, 1919.

Meter.	Size, in inches.										Total.
	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	3	4	6	8	
American.....	18	2	8		1						29
Crown.....		1	3		2	4	5		2		17
Emrie.....	13	4				2	2	3	1		25
Enarc.....	5	5	1	5	5						21
Gannon.....	2										2
Gem.....							5	4			9
Hersey.....	2,648	153	20		39	12	3				2,875
Keystone.....	745	15	4		3	2	3				772
King.....	14	1	1		5	2					23
Lambert.....	75	39	28		28	2	10	2			144
Nash.....	6	71	98		62	28	13	6	4		288
Nicarra.....		38	30	10	21	22					122
Pittsburg.....	2	4	3		5	4	1				19
Standard.....					1						1
Thomson.....		6	1		6	2					15
Trident.....	111	16	27		15	1	5	5			180
Union.....			8		2				1	1	12
Worthington.....	7,182	26	11	7	18	7	10	8			7,269
Total.....	10,803	390	251	18	213	98	57	24	8	1	11,863

Cost of operating pumping engines at the District pumping station during the fiscal year ended June 30, 1919.

Operating expenses:

Salaries—1 chief steam engineer; 3 steam engineers; 3 assistant steam engineers, 3 firemen; substitute engineers; substitute firemen; boiler cleaners; steam fitters; electrician; helpers, and laborers.....	\$30,328.11
Coal—16,787.835 pounds bituminous coal at \$6.36 per ton.....	47,665.43
Miscellaneous supplies.....	5,070.11
Repairs to pumps, engines, boilers, and electric generators:	
Per diem labor.....	\$6,275.30
Material expenses.....	5,188.82
	11,464.12
Total cost of operation.....	94,527.77

Total pumpage for the year, without allowance for slip—gallons	11,253,358,880
Greatest amount pumped in 1 day (Dec. 4)	do 35,527,430
Least amount pumped in one day (Aug. 1)	do 27,289,680
Average dynamic head against pumps, in feet	107.2
Duty <u>Gallons pumped, etc.</u>	
Total fuel consumed	59,930,536

Total fuel consumed	
Cost of fuel, pumping 1,000,000 gallons 1 foot high—cents	3 ⁹⁵ ₁₀₀
Total operative cost of pumping 1,000,000 gallons 1 foot high—cents	7 ⁸⁴ ₁₀₀
Total operative cost per 1,000 gallons pumped—do— ⁸⁴ ₁₀₀	

The above items of salaries, supplies, and repairs were furnished by the clerical division. The pumpage is figured from plunger displacement, without allowance for slip. The aggregate slip of all reciprocating pumps during the year, based on pitometer determinations, was 4.18 per cent. Venturi meter measurement was made of pumpage by the centrifugal pumping unit. The average dynamic head is figured from the total work done by pumping engines and generators. The fuel consumed is the total coal burned excluding the heating system. The cost of heating—431,070 pounds of coal—was \$1,239.31.

During the year there were 1,300 gallons of oil removed from the material passed by the waste-cleaning machine and rendered fit for use in oil cups.

All of the coal burned at the pumping station during the year was bituminous coal, furnished by the United States Government. Samples were collected from each delivery which was usually a 300-ton lot, and sent to the Bureau of Mines, where tests were made. The analyses averaged 2.2 per cent moisture "as received" and 18 per cent volatile matter, 70.71 per cent fixed carbon, 1.37 per cent sulphur, 11.35 per cent ash, and 13,710 British thermal units per pound, on the dry-coal basis.

The total pumpage for the year at the District pumping station was 11,253,354,880 gallons, which is 605,194,880 gallons more than in 1917-18. The total operating expenses chargeable to pumpage was \$94,527.77, as against \$74,128.88 in 1917-18, making the total operative cost of pumping 1,000,000 gallons of water into the mains, \$8.40. This is \$1.49 per million gallons more than in 1917-18, and is due partly to the increased cost of labor and material, and partly to the falling off in station duty. The average cost of coal per ton for the year was \$6.36.

The station duty for the year was 59,930,536 foot-pounds per 100 pounds of coal. This is 8.9 per cent less than the duty obtained during the preceding year, and represents an annual loss of approximately 875 gross tons of coal. This loss in duty may be attributed to a greater proportionate amount of work performed by the low-duty pumping units.

Reports submitted during the year include all special tests made, and the daily pumping station and water consumption reports.

The accompanying tabular statements show the sizes and makes of all private and municipal water meters tested during the year, and the operative cost of pumping.

The normal force employed, in addition to myself, consisted of two computers, one skilled laborer, one plumber, and one helper.

H. D. YATES, *Engineman.*

To ASSISTANT ENGINEER, WATER DEPARTMENT.

Sir:

The following report of Division "D," Care and Maintenance of Valves, Care of Reservoirs and Tanks, Miscellaneous Plumbing, Inspection and Repairs to Fire Hydrants, Street Hydrants, Pumps and Fountains and Repairs to Leaks, for the fiscal year ended June 30, 1919, is respectfully submitted herewith:

Valves:

Operated—	4,305
Packed—	105
Fitted with new keynnts—	5
Examined for condition—	235
Repaired—	99
Inspected to check normal position—	225

Valves—Continued.	
Capped—	5
From which gates were removed—	1
Installed (2½ inches)—	1
Fitted with new brass stems in place of old—	
12-inch, 2-way—	2
6-inch, 2-way—	7
6-inch, 4-stem—	1
6-inch, 3-way—	3
4-inch, 2-way—	1
3-inch, 2-way—	1
Valve casings:	
Cleamed—	4
Uncovered—	204
Examined for number plates—	1,175
Marked for number plates—	92
In which number plates were installed—	16
Examined for grade—	1,128
Examined for condition—	1
Valve casing covers installed in place of old—	3
Air valves:	
Installed—	6
Installed in place of old—	2
Repaired—	1
Blow-offs flushed—	1,376
Indicator posts:	
Reset—	24
Removed—	2
Painted—	248
Stenciled—	235
Cleared of weeds—	28
Erected—	5
Recapped—	10
Indicator post caps painted—	397
Intersections located—	235
Fire hydrants:	
Examined—	34,420
Repaired—	746
Lubricated—	7,987
Flushed—	214
Painted—	49
Adjusted—	1
Erected—	1
Erected in place of old—	1
Cleared of weeds—	65
On which air valves were placed—	90
Reversed—	4
Pressures taken—	16
Public hydrants:	
Erected—	12
Erected in place of old—	13
Examined—	5,089
Repaired—	283
Removed and abandoned—	6
Thawed out—	10
Cleared of ice—	7
Flushed—	10
Adjusted to grade—	1
Horse fountains:	
Repaired—	86
Cleamed—	6,336
Examined for condition—	2
Erected in place of old—	3
Adjusted to grade—	2
In which float valves were cleaned—	81
Usings in horse fountains cleaned—	29
Combination fountains repaired and reset—	1

Pumps:		
Examined	1,556	
Repaired	78	
Erected in place of old	2	
Removed	1	
Painted	2	
Removed and abandoned	1	
Sanitary drinking fountains:		
Repaired	64	
Cleaned	921	
Adjusted	1	
Erected in place of old	2	
Traps cleaned	2,631	
Miscellaneous inspections made	53	
Standpipes removed from blow-offs	1	
Curb boxes repaired	3	
Brightwood Reservoir:		
South basin—		
Cleaned	1	
Sprayed	1	
North basin—		
Cleaned	1	
Sprayed	1	
Complaints:		
Unpalatable water	6	
Low pressure	2	
Water hammer	4	
No water	3	
Service pipes:		
Repaired	33	
Laid	6	
Reconnected	1	
Abandoned	4 ⁹	
Changed from old to new mains	17	
Thawed out	1	
Drainpipes:		
Repaired	3	
Laid	5	
Cleaned	20	
Mains:		
Examined	2	
Capped	1	
Fittings strapped to mains	10	
Smith cuts made	14	
Cut-offs made	61	
Connections made on mains	10	
Lead connections made	6	
By-passes:		
Repaired	1	
Removed	1	
Springs cleaned	1	
Fire alarms answered	2	
Traps installed in place of old	1	
Bleeders:		
Installed	3	
Repaired	3	
Examined	8	

MISCELLANEOUS WORK.

Removed all angle valves from standpipes, drained and capped same for winter months, and replaced and turned on water for summer months at the Bryant Street pumping station, Anacostia pumping station, Brightwood and Reno reservoirs.

All valves equipped with hydraulic operators were operated once each month to keep them in good working order.

The field gauge was tested once each month.

All plumbing was kept in repair in water department buildings, Camp Pleasant, and Camp Good Will.

Examined fire hydrants and air valves once each week on main from Congress Heights to Blue Plains SW., to remove accumulated air from main.

Monthly examinations were made for leakage on closed valves controlling services to the Willard Hotel.

Monthly examinations were made of valves and check valves controlling the service to the Columbia Hospital to ascertain if they were in good working order and responsive to the varying water pressure.

Investigated conditions relative to abnormal consumption of water at the Government Hospital for the Insane in Congress Heights, Evening Star Building, and the Dunbar High School.

Examined the fixtures for detection of waste of water in the Homer Building, at Fifteenth and G Streets NW., and in the Government buildings on B Street between Sixth and Seventh Streets NW., and on B Street between Eighteenth and Nineteenth Streets NW.

Inspected for condition and normal position all divide valves and side stops in the territory bounded by W Street NW., Michigan Avenue NE., Second Street NW., and Tenth Street NE.

Opened all bleeders on exposed mains for the winter months and closed same for the summer months.

Turned off water to various fixtures and buildings, drained boilers and pipes for winter months at Camp Good Will, Rock Creek Park, and turned on same for summer months.

Made permanent shift from the first high to the gravity service in all mains between Seventeenth and Nineteenth Streets east and between B Street SE. and B Street NE.

Erected recording gauges and turned on water in the following locations: Conduit Road and Jewett Street NW., Four-and-a-half and P Streets SW., Twenty-eighth and Douglas Streets NE., and First Street and Nichols Avenue SE.

Erected three-fourths-inch standpipe and self-closing spigot with 2-inch pipe casing for use of military camp at west end of the Pennsylvania Avenue Bridge SE.

Removed bubble jets and flushed supply pipes of sanitary drinking fountains at various locations.

Examined all valve casings before and after completion of repairing and resurfacing of streets and where granolithic sidewalks were laid to see that they were properly adjusted to grade and the proper number plates attached.

The water towers in Randle Highlands, Good Hope, and Congress Heights were inspected monthly.

REPORT OF LEAKMEN'S WORK, DIVISION "D."

Broken mains repaired (16 inches and larger)-----	11
Broken mains repaired (3 to 12 inches)-----	35
Joints repaired (16 inches and larger)-----	56
Joints repaired (3 to 12 inches)-----	382
Service pipes found closed-----	53
Service pipes reported leaking and cut off at main-----	129
Service pipes reported leaking and cut off at meter-----	30
Service pipes reported leaking and cut off at box-----	251
Service pipes reported leaking and cut off inside house-----	21
Service pipes cut and plugged-----	3
Service pipes abandoned-----	26
Promises where supply was turned on by request-----	119
Small leaks found in charge of plumbing-----	22
Leaks referred to the water registrar-----	34
Meters reported leaking-----	18
Meters reported frozen-----	1
Meters reported leaking, referred to the water registrar-----	44
Meters reported choked-----	2
Leaks reported and found to be wrong number-----	19
Sewers reported leaking, referred to the health department-----	1
Obstructed sewers, referred to the health department-----	38
Obstructed sewers reported-----	23

Reported leaks found to be false.....	164
Reported leaks, could get no response from occupants.....	29
24-hour notices served.....	315
48-hour notices served.....	13
Valves reported broken.....	1
Valves reported leaking.....	21
Air valves reported broken.....	2
Air valves reported leaking.....	1
By-passes reported leaking.....	1
Bleeders reported leaking.....	1
Fire hydrants reported leaking.....	12
Fire hydrants reported broken.....	5
Horse fountains reported leaking.....	1
Horse fountains reported broken.....	3
Sanitary drinking fountains reported leaking.....	1
Public hydrants reported leaking.....	9
Public hydrants reported broken.....	1
Drains choked.....	1

Examined all exposed mains (28 locations) once each week for leakage.
Pumped out valve casings and vaults in various locations and pumped out 12 flooded cellars.

W. R. WOODWARD,
Chief Inspector of Valves.

The SUPERINTENDENT OF THE WATER DEPARTMENT.

TELEPHONE SERVICE.

SIR: I respectfully submit the following report of work done by the telephone operators at the water department switchboard, during the year ended June 30, 1919.

A brief summary of the chief items of work done during the year is as follows:

Recorded—

Leaks.....	3,984
Fire hydrants out of service.....	543
Fire hydrants in service.....	560
Cut-offs by water survey division.....	522
Fire alarms.....	1,173
Reservoir elevations.....	2,190
Gate house elevations.....	306
Engine counters, Anacostia.....	1,460
Engine counters, Reno.....	1,095
Leakmen's reports.....	9,423
New jobs.....	674
No-water complaints.....	109
Low-pressure complaints.....	33
Turn-on services.....	219
Issued work orders for repair of fire hydrants, etc.....	809
Issued morning reports of various job locations.....	3,286
Telephone connections.....	365,860

All records of leaks and movements of the leakmen are kept by the telephone operators at the department switchboard.

The daily morning report of the various job locations, construction, and repair gangs is compiled and typewritten by the telephone operators.

All records of broken valve covers, dangerous holes, etc., are handled by the telephone operators through the storeroom and stable. On Sundays and holidays this work is assigned to the leakmen for disposition.

New fire hydrants erected, and fire hydrants in place of old, are recorded by the telephone operators, and all information pertaining to same is transmitted to Chief Wagner's office, District of Columbia fire department.

Reports from various foremen, relative to underground exposure of properties of the public service corporations, during the year, were reported to the Public Utilities Commission, by the chief telephone operator.

The telephone switchboard is connected by means of four lines with the Chesapeake & Potomac Telephone Co.; by one line with fire-alarm headquarters, three lines with main 6,000, and 32 lines to various divisions and branches of the department, reservoir, etc.

The present force in the telephone room consists of a chief operator and two telephone operators.

CONRAD REINHARD,
Chief Telephone Operator.

THE SUPERINTENDENT OF THE WATER DEPARTMENT.

DISTRICT PUMPING STATION.

The following is a summary of work done at the District Pumping Station during the fiscal year beginning July 1, 1918, and ending June 30, 1919: Water pumped, figured from plunger displacement:

First high service	gallons	7,139,192,000
Second high service	do	3,195,886,990
Third high service	do	912,226,400
Total	do	11,247,305,390
Fourth high service	do	98,682,115
Coal burned	tons	7,671.36
Cylinder oil used	gallons	817.80
Engine oil used	do	1,603
Filtered oil used	do	1,017.75
Grease used	pounds	533.25
Waste used	do	887.25

The regular force employed for the operation of the pumping engines, boilers and auxiliaries, cleaning of machinery, etc., is as follows:

	Steam engineers.	Assistant steam engineers.	Firemen.	Oilers.	Cleaners.	Laborers.
Sunday.....	4	3	3	4	4	4
Week days.....	4	3	3	4	4	4

For the fourth high service, the water is pumped from the Reno reservoir—which is supplied by the third high service pumps—to an elevated tank, by gasoline engines and triplex pumps. This machinery is operated daily by the watchman in charge of the reservoir, and two assistants on night duty. The water pumped for this service during the year was, 98,682,117 gallons, or a mean of 270,197.5 gallons daily.

The Anacostia pumping station has been operated without interruption during the year, pumping to the three towers supplying the area east of the Anacostia River. This station is taken care of by four men.

The water pumped during the year, figured from plunger displacement, follows:

	Gallons.
First high service	118,688,400
Second high service	11,591,560
Total	130,279,960
or a mean of 356,031.4 gallons daily.	

REPAIR SHOPS.

The work accomplished during the year follows: All necessary repairs for machinery at the District pumping station, Reno and Anacostia stations; repairs to automobiles and trucks for this department and other departments of the District of Columbia; made practically all repair parts for fire plugs, valves, street hydrants, etc., including all tools used on the work of laying

water mains, etc., such as picks, chisels, breakers, calking tools, yarning irons, valve keys, pipe bands, eyebolts, arch irons, and miscellaneous tools and appliances as required for the various work.

The detail of the work follow, in part: Put lines in connecting rods and new joints in steam connections on No. 4 engine; repaired waste cleaning machine; made crank shafts for Dent fire plugs; made valve springs for pumps; ran pipe for heating system for garage in stable yard; put new tubes in No. 5 boiler; made repairs to coal crusher; bored out trunnion bearing for concrete mixer for surface department; repaired boiler and pipe in west garage; put up pipe rail around boiler pit at Reno; made repairs and changed piping on Holly return system; made new magneto coupling for air-compressor engine; repaired boiler furnaces and water softener; made repairs to flywheels of No. 1 engine at Reno station; made gate post for Brightwood Lodge; repaired pipe on boiler feed supply; made tire carrier for auto; put on band and braced No. 4 pump chamber; made new lathe center; made repairs to pump and gas engine for superintendent of bridges; put Venturi meter tube in feed line in boiler room; repaired turbine tube cleaner; cut nipples for storekeeper; made brass castings for valves, National Research Council, electrical department, Bureau of Standards, fire department, street-cleaning department, sewer department, District of Columbia repair shop, etc.; made aluminum signs for electrical department, and aluminum castings for Bureau of Standards; repaired 3,617 water meters and 62 valves; built and tested 229 valves and 25 street hydrants.

BRASS FOUNDRY.

During the year all composition metal castings for valve work, repair parts, etc., have been made in our foundry. There were made in the foundry 9,457 pounds of brass castings, small and medium size, such as would be made in a general jobbing shop. The showing of the foundry for the year has been very satisfactory, and the repair work at this station has been much expedited by the casting of repair parts when needed for emergency. Attention is invited to the annual report of the foundry.

BLACKSMITHING.

The blacksmiths have forged bolts for engines; made **S** hooks for fire plugs; repaired tools; made pipe bands, feather wedges, **T** bolts, irons for coal-crusher hopper, new diamond-point chisels, lifting chisels, flogging chisels, flat chisels. Made iron hangers for superintendent of parkings. Sharpened 3,784 chisels, 6,615 picks, 211 steel bars, 32 frost pins, and made 12 frost pins. Repaired 293 stakes; dressed 45 calking sets; and welded 610 new ends on picks.

CARPENTRY.

Built areaway to cellar at Reno Lodge, and door for same. Repaired field boxes for water survey division; repaired body on 2½-ton truck; made doors for stable, shed, and garage; built garage in stable yard. Repaired body on 5-ton truck. Sharpened saws for storekeeper; cut hole through basement wall for heating conduit for stable yards. Made tool box for transit box; repaired 5-ton platform scales; made storm sash for Reno; made new top for Lippard auto; repaired doors in leakmen's shelter; made file rack for water survey division; made forms for concrete covers; made drawing board for water survey division, and card cases for meter cards. Repaired doors in station. Changed counter in office at District building. Made screens for Anacostia station; repaired floor in greenhouse. Built pattern rack in loft. Put body on Wilcox leak truck. Made tool rack for meter room. Inspected buildings at Anacostia, Reno, and Brightwood. Made 396 8-inch concrete rings, 228 4-inch concrete rings, 198 8-inch sectional rings, 54 24-inch covers, 21 36-inch covers, 112 8-inch cylinders, 7 8-inch reducing rings, and filled and roughed 314 casing covers.

PAINTING.

The painters have painted walls, ceilings, and woodwork at Brightwood Lodge; painted storm wagons and wheels for police patrol. Repaired cushions for leak trucks; painted pitometer boxes; covered drum heads on No. 7 boiler; repaired asbestos covering on boilers; painted greenhouse; painted woodwork of stable, street hydrants; painted and stained floors inside of

Reno Lodge, walls, and woodwork; lettered new auto trucks and motorcycle; covered top of auto ambulance; painted crane at Anacostia. Inspected tower and pipe at Bridgtwood Reservoir. Glazed and painted storm sash at Reno; stained and finished cabinet for water survey division; cleaned and painted boats for Brightwood Reservoir. Cleaned and painted window frames and woodwork in District pumping station. Painted apartment over repair shop. Stained and varnished counter in office at District Building. Painted gutters and downspouts on stable and blacksmith shop.

ELECTRICAL WORK.

The electrician and helper have taken care of generators, switchboards, motors, lights, etc.; operated conveyor, economizer, and crane; tested and recharged storage batteries; repaired electric fans and lighting systems on various automobiles; cleaned ejector in coal crusher; repaired cable and lights on No. 7 engine; repaired lights in vault at Fourth and Bryant Streets; repaired engine stop on No. 4 engine; adjusted blueprinting machine; drilled buckets and made repairs to conveyor. Set up pump for superintendent of parkings. Ran wires and connected call bells for water survey division. Ran conduit and made connections for motors on machine tools for superintendent of parkings.

CARE OF STATION.

The janitor's force has taken care of all cleaning throughout the building; removing shavings from the wood-working shop; attended to window cleaning, removing turnings, scrap, and other material from machine shop; furnished service to the office, etc.

JAS. T. FINK,
Master Mechanic.

THE SUPERINTENDENT OF THE WATER DEPARTMENT.

WATER SURVEYS.

SIR: I have the honor to submit herewith the annual report of the operations of the division of water survey for fiscal year ended June 30, 1919.

Leakage and waste of water in the District of Columbia are increasing rapidly. Present high consumption is not due entirely to increased population. Millions of gallons daily can be saved by proper preventative measures which the department has the power to inaugurate at once. During the past year 1,160,000 gallons daily underground leakage was detected and stopped by this division in spite of the most inefficient conditions. Leakage of over 6,000 gallons daily per mile of main surveyed represents what was found by detailed surveys during the year. Thousands of gallons leakage per day was stopped merely by the most superficial examinations in sections which could not be given close scrutiny. The total leakage found might easily have been doubled or even trebled by slightly increased operative force in this division and ample transportation facilities. For years the work of this division has consistently resulted in reduced total consumption, reduced per capita consumption and reduced percentage of night flow. Last year due to curtailment of working force and lack of proper transportation facilities the work was seriously handicapped. Maps, records, tabulations, and matters of every description which are necessary for the efficient prosecution of water survey work have been neglected to such an extent that it will take several years to restore normal conditions even though proper organization were established at once. With the menace of water shortage ever present and the efficacy of the water surveys proved by past accomplishments steps should be taken at once to place this division in shape by filling the gaps in its organization and increasing transportation facilities to meet the situation. A schedule of wages should be adopted at once to permit the securing and retention of capable water-waste engineers to carry out an intensive drive against leakage and wasteful practices. During the past year usage of water even through meters was curtailed by orders of the commissioners, thereby reducing materially the revenue of the department. The State of Maryland is ready to receive

and pay for whatever water the District of Columbia can spare. No definite plans are yet made for an enlargement of the supply system. Certainly the facilities at hand for preventing leakage and waste, known to be millions of gallons, should be utilized to the fullest extent.

Statements of the work of this division are submitted as supplement to this report. They give in detailed tabulated form all data of value. The most significant points of interest are obvious but brief reference is made here to them.

The total underground leakage found and prevented was 1,160,000 gallons daily or over 300,000 gallons daily greater than found during the previous year in spite of the fact that the work was confined to smaller area. The average main leakage per mile found last year of 6,120 gallons daily shown on statement No. 3, compared with previous corresponding figures is significant of conditions generally throughout the city. Reference to statement No. 1 shows that a much greater number of leaking service pipes was discovered considering the relatively limited territory and that the average waste per leak was considerably higher than found at any time since 1912. These facts are significant and also indicative of conditions throughout the city. Inspection of fixtures in unmetered houses was limited during the year by the fact that work was done in sections which were practically 100 per cent metered. The somewhat low percentage of houses found with defective fixtures as shown on statement No. 4 is not fairly indicative of true conditions, due to the limited number of examinations. Measurements of flow into permanent districts as shown on statement No. 5 give further indication of the growth of leakage in the city. Percentages of night rate are too high, especially so in view of the recent heavy increase in population. Surveys in districts K and L, as shown on statement No. 6, were incomplete in many details due to conditions over which this division has no control.

Special investigations were made during the year for various purposes. This work does not increase the total leakage found by this division but consumes a vast amount of time of the most valuable employees. The work, however, is of a necessary and important nature. Measurement of total flow was made at the sewerage pumping station to determine whether previous wasteful practices were again occurring. Conditions were found satisfactory.

Lack of pressure at the Boys' Reform School on Bladensburg Road involved this division in an investigation lasting several months. The purpose of this was to locate excessive intermittent peak loads on the supply system throughout the eastern section of the Brightwood service. The trouble was traced to the Corby's yeast factory at Langdon and partly to a penstock in the Baltimore & Ohio Railroad yards in Eckington. The trouble due to the latter was remedied by abandonment of the fixture upon our request to the Washington terminal manager. Closure of a 12-inch divide valve on Bladensburg Road between Corby's plant and the reform school practically remedied the conditions in so far as low pressures were concerned at the latter place and at other high points in the vicinity, but caused a low pressure condition in the Corby plant. Complete survey in detail of the water usage in this plant and a general revision of meter and water distribution systems were found to be necessary to permit the plant to continue in operation. This work was performed under the direct supervision and according to plans devised by this division. The results have been entirely satisfactory and no complaints of any nature have been received since completion.

Investigation of water usage in ice and refrigerating plants at the United States Soldiers' Home was made and recommendation submitted, upon request, as to our opinion of the best method to permit the reuse of the cooling water.

Complete inspection of all fixtures in school buildings throughout the city resulted in the detection of a great waste of water, particularly during the hours when the buildings are closed at night. Recommendation was made to the superintendent to refer this matter directly to the school authorities.

Complete inspection and flow tests were made at Walter Reed Hospital resulting in the submission of an itemized list of 130 leaking fixtures to the Quartermaster Corps. Officials in charge have promised immediate repairs.

The total cost of running the water survey division for the year was \$33,462.25. This was abnormally high as compared to previous costs and results. This was due to the increased cost of labor, disorganization of force, and lack of transportation facilities. The water saved alone, ignoring other valuable work accomplished, represents an annual return upon the investment

of 67 per cent. Cooperation and thorough work on the part of the employees made this result possible.

Very respectfully submitted.

PAUL LANHAM,
In Charge Water Survey.

The SUPERINTENDENT WATER DEPARTMENT.

SUPPLEMENTS.

Statement No. 1. Underground leaks, 1907-1919.

Statement No. 2. Year's results, 1919.

Statement No. 3. Sources and quantities of underground leakage, 1907-1919.

Statement No. 4. Results, house inspection, unmetered, 1907-1919.

Statement No. 5. Measurements of permanent districts, 1919.

Statement No. 6. Survey of permanent districts.

A. District "K," first high.

B. District "L," first high.

STATEMENT NO. 1.—Underground leaks, 1907-1919.

Year.	Number.	Quantity (gallons per day).	Average (gallons per day).	Year.	Number.	Quantity (gallons per day).	Average (gallons per day).
1907-8.....	271	5,604,400	20,700	1914-15.....	385	1,828,820	4,800
1908-9.....	832	9,560,600	11,500	1915-16.....	420	1,981,600	4,700
1909-10.....	532	6,364,200	12,000	1916-17.....	340	1,752,750	5,155
1910-11.....	624	6,921,900	11,100	1917-18.....	178	834,640	4,689
1911-12.....	813	5,115,300	6,300	1918-19.....	180	1,160,510	6,447
1912-13.....	561	4,195,100	5,400	12 years.....		43,872,620	7,851
1913-14.....	452	2,552,800	5,600				

STATEMENT NO. 2.—Year's results, 1918-19.

Service pipes inspected:

Metered.....	26,138
Unmetered.....	15,080
Houses inspected, unmetered.....	1,062
Houses with defective fixtures.....	62
Number of notices served.....	75
Number of service cut off.....	22

Underground leakage.

Class.	Number.	Gallons per day.	Class.	Number.	Gallons per day.
Abandoned services, taps, etc.	1	8,000	Stopcocks.....	1	3,500
Iron services.....	39	325,900	Joints on mains.....	41	406,800
Lead services.....	18	147,000	Valves.....	1	3,200
Wiped joints.....	21	118,100	Total.....	180	1,160,510
Services, metered.....	43	99,360			
Coupling.....	15	48,650			

BLUE PRINTS.

Blue prints made for Division E.....	365
Blue prints made for Division B.....	96

EXPENSES.

Operating: Per diem labor and material.....	\$27,583.53
New work: Per diem labor and material.....	5,878.72
Total.....	33,462.25

STATEMENT No. 3.—*Sources and quantities of underground leakage, 1907–1919.*

Class.	1907-8	1908-9	1909-10	1910-11	1911-12	1912-13	1913-14
SERVICES.							
Abandoned taps and services.....			Galls. daily.	Galls. daily.	Galls. daily.	Galls. daily.	Galls. daily.
Iron services.....			355,300	173,600	174,200	180,900	101,700
Lead services.....	2,729,000		{ 2,438,000	1,508,900	2,329,800	1,988,800	924,000
Wiped joints.....	327,000	5,214,000	1,201,900	1,237,600	976,700	394,000	471,000
Couplings.....			719,190	696,700	438,100	282,300	237,000
Stopcocks.....			118,700	182,900	123,700	75,600	65,900
Street washers.....			84,800	43,300	53,500	32,900	16,900
Public hydrants.....				42,000	10,400	5,700	500
Unclassified.....	111,000	2,039,500		84,200	50,200	21,000	12,000
Total gallons.....	3,167,000	7,253,500	4,908,800	4,036,800	4,260,400	2,996,200	1,886,500
MAINS.							
Joints on mains.....	1,039,500	1,345,600	1,034,200	2,562,500	746,300	962,300	596,800
Broken mains.....	1,200,000	117,000	332,000	15,900	7,000	103,300	62,200
Valves.....	23,500	62,000	89,100	110,900	27,100	13,200	6,800
Blow-offs.....		737,000		176,600	71,300	6,000	
Fire hydrants.....	174,000	45,500		19,200	3,500	115,000	500
Total gallons.....	2,437,400	2,307,100	1,455,300	2,885,100	855,200	1,199,500	666,300
Total miles.....			62	192	194	292	298
Average per mile.....			23,473	15,027	4,408	4,109	2,236
Grand total.....	5,604,400	9,560,600	6,364,100	6,921,900	5,115,600	4,196,000	2,552,800

Class.	1914-15	1915-16	1916-17	1917-18	1918-19
SERVICES.					
Abandoned taps and services.....	Galls. daily.	Galls. daily.	Galls. daily.	Galls. daily.	Galls. daily.
Iron services.....	54,700	68,700	124,400	64,540	8,000
Lead services.....	861,959	449,440	759,600	298,700	325,900
Wiped joints.....	254,100	201,380	143,900	44,000	147,000
Couplings.....	213,500	342,480	128,890	96,300	118,100
Stopcocks.....	20,500	115,450	120,880	35,700	48,650
Street washers.....	17,150	28,700	26,800	4,600	3,500
Public hydrants.....					
Unclassified.....	500				
Total gallons.....	32,200		168,780		99,360
	1,454,600	1,206,150	1,479,250	543,840	750,510
MAINS.					
Joints on mains.....		368,800	607,350	130,500	267,300
Broken mains.....		142,800	115,000	18,000	406,800
Valves.....	300	3,300	13,000	5,500	3,200
Total gallons.....		374,220	775,450	273,500	290,800
Total miles.....		113	183	151.5	410,000
Average per mile.....	3,320	4,237	1,800	2,700	6,120
Grand total.....		1,828,820	1,981,600	1,752,750	834,640
					1,160,510

STATEMENT No. 4.—*Results, house inspection, 1907–1919, unmetered.*

Year.	Houses inspected.	Houses with defective fixtures.	Percentage.	Year.	Houses inspected.	Houses with defective fixtures.	Percentage.
1907-08.....	(1)	(1)	(1)	1913-14.....	17,039	1,603	9.4
1908-09.....	27,758	4,621	16.6	1914-15.....	17,563	1,691	9.6
1909-10.....	21,642	3,305	15.2	1915-16.....	6,191	480	7.8
1910-11.....	21,547	3,262	15.1	1916-17.....	9,977	904	9.0
1911-12.....	31,289	4,943	15.7	1917-18.....	3,897	447	11.2
1912-13.....	26,397	3,725	14.1	1918-19.....	1,062	62	5.8

¹ No record.

STATEMENT No. 5.—*Measurement of permanent districts, 1918-19.*

Dis-trict.	Boundaries.	Date.	Consump-tion.	Night rate.	Per cent.
A	From New Jersey Avenue to Fourteenth, B to L Streets, NW.	Aug. 15-22, 1918...	10,485,900	.....	.....
E	From Fourteenth to Rock Creek, River to P Street NW.	Sept. 18-24, 1918...	9,321,400	7,263,700	78
F	From New Jersey Avenue NW. to Eastern Branch, E to Florida Avenue NE.	Mar. 3-10, 1919....	10,530,200	6,681,900	63
G	From E Street NE. to E Street SE., First to Eastern Branch.	June 19-26, 1919...	4,004,200	2,268,800	57
I and K	From Eleventh to District line west, Pennsylvania Avenue to Florida Avenue NW.	July 1-7, 1919....	8,416,900	6,214,700	74

STATEMENT No. 6A.—*Pitometer district K, survey No. 5.*

Date of measurement,	.....
Mean daily supply,	.....
Minimum night rate,	.....
Ratio of minimum night rate to mean daily supply,	.....
Subdivision survey:	
Started, May 18, 1918.	
Finished, June 13, 1919.	
Population:	
Resident—	
Metered—	(¹)
Unmetered—	(¹)
Total—	(¹)
Floating—	
Metered—	(¹)
Unmetered—	(¹)
Total—	(¹)
Per capita consumption, computed from resident population	(¹)
Buildings:	
Dwellings—	
Metered—	3,706
Unmetered—	124
Hotels and apartments—	
Metered—	107
Unmetered—	0
Municipal buildings—	
Metered—	10
Unmetered—	0
Federal buildings—	
Metered—	4
Unmetered—	0
Factories—	
Metered—	9
Unmetered—	0
Restaurants—	
Metered—	0
Unmetered—	0
Miscellaneous—	
Metered—	759
Unmetered—	29
Total—	
Metered—	4,586
Unmetered—	153

¹ No figures.

Night flow detected by subdivision	gallons per day	1,642,500
Due to inside flow—		
Metered	do	1,391,600
Unmetered	do	5,400
Due to underground leakage—		
Service pipes	do	129,700
Joints on mains	do	76,300
Valves	do	3,500
Total	do	209,500
Due to Federal buildings and fountains	do	0
Due to municipal buildings, flush basins, horse founts	do	4,200
Total flow accounted for	do	1,606,500
Total flow unaccounted for	do	36,000
Miles of mains		30

STATEMENT No. 6B.—*Pitometer district L, survey No. 5.*

Date of measurement,		
Mean daily supply,		
Minimum night rate,		
Ratio of minimum night rate to mean daily supply,		
Subdivision survey:		
Started, Aug. 25, 1918.		
Finished, Sept. 3, 1919.		
Population:		
Resident—		
Metered		(¹)
Unmetered		(¹)
Total		(¹)
Floating—		
Metered		(¹)
Unmetered		(¹)
Total		(¹)
Per capita consumption, computed from resident population		(¹)
Buildings:		
Dwellings—		
Metered		6.969
Unmetered		164
Hotels and apartments—		
Metered		34
Unmetered		0
Municipal buildings—		
Metered		16
Unmetered		0
Federal buildings—		
Metered		3
Unmetered		0
Factories—		
Metered		5
Unmetered		0
Restaurants—		
Metered		0
Unmetered		0
Miscellaneous—		
Metered		653
Unmetered		40
Total—		
Metered		7.407
Unmetered		204

¹ No figures.

Night flow detected by subdivision	gallons per day	1,455,000
Due to inside flow—		
Metered	do	728,100
Unmetered	do	21,000
=====	=====	=====
Due to underground leakage—		
Service pipes	do	389,300
Joints on mains	do	231,500
Valves	do	24,400
=====	=====	=====
Total	do	645,200
Due to Federal buildings and fountains	do	0
Due to municipal buildings, flush basins, horse founts	do	5,400
=====	=====	=====
Total flow accounted for	do	1,399,700
Total flow unaccounted for	do	55,300
Miles of mains		37

ACCOUNTS AND STORES.

Sir: The following is a summary of the work done during the fiscal year ended June 30, 1919, by the division of accounts and stores.

The expense account, and other tables herewith, show in detail the cost of operating the department; and the following statement shows the volume of miscellaneous office work done:

Vouchers passed	2,299
Requisitions made	636
Letters mailed	679
Official letters written	551
Work orders issued	1,192
Files received and forwarded	1,131
Pay rolls made	1,355
Miscellaneous papers handled	60,129
Letters filed	1,633
Transfer vouchers made	292
Records made on cards	1,946
=====	=====
	71,843

In the storekeeping branch the duties and responsibilities of Mr. W. V. Robertson, inspector in charge, were increased by placing under his direction the whole transportation of the department. The following is quoted from his report and shows that the increased duties imposed upon him have been discharged in an economical and efficient administration of the business of his important branch of this Division.

STOREKEEPING.

The cost of operating the storekeeping branch for the year was 3.72 per cent of the value of material issued and equipment disposed of. The cost of operating this branch for the past five years has been as follows:

	Per cent.
1915	4.676
1916	4.64
1917	3.91
1918	3.13
1919	3.72

The values of material and equipment received and issued during the year were as follows:

Year.	Material.		Equipment.	
	Receipts.	Issues.	Receipts.	Issues.
1919	\$348,282.99	\$338,328.15	\$22,804.59	\$16,853.94

¹ No figures.

The following table shows these values for the past five years:

Year.	Material.		Equipment.	
	Receipts.	Issues.	Receipts.	Issues.
1915.....	\$244,152.74	\$264,838.36	\$170,140.38	\$1,915.94
1916.....	255,174.17	254,945.05	23,461.60	30,379.82
1917.....	340,157.19	331,880.02	10,732.97	4,718.69
1918.....	380,113.88	321,578.56	42,414.29	5,439.40
1919.....	348,282.99	338,328.15	22,804.59	16,853.94

The value of material on hand at close of the year was \$218,446.61, and the value of equipment in stock and in service at close of the year was \$695,150.42.

TRANSPORTATION.

Hauled for use by construction forces and for storage in the property yards the following material:

- 49 tons of 48-inch cast-iron pipe.
- 7 tons of 36-inch cast-iron pipe.
- 418 tons of 24-inch cast-iron pipe.
- 84 tons of 20-inch cast-iron pipe.
- 277 tons of 16-inch cast-iron pipe.
- 927 tons of 12-inch cast-iron pipe.
- 911 tons of 8-inch cast-iron pipe.
- 60 tons of 6-inch cast-iron pipe.
- 30 tons of 4-inch cast-iron pipe.
- 26 tons of 3-inch cast-iron pipe.
- 120 tons of miscellaneous cast-iron fittings.
- 1 ton of 48-inch cast-iron fittings.
- 7 tons of 36-inch cast-iron fittings.
- 2 tons of 30-inch cast-iron fittings.
- 19 tons of 20-inch cast-iron fittings.
- 23 tons of 16-inch cast-iron fittings.
- 45 tons of 12-inch cast-iron fittings.
- 112 tons of 8-inch cast-iron fittings.
- 50 tons of 6-inch cast-iron fittings.
- 17 tons of 4-inch cast-iron fittings.
- 9 tons of 3-inch cast-iron fittings.
- 87 lengths of 24-inch T. C. pipe.
- 360 lengths of 15-inch T. C. pipe.
- 57 cubic yards of gravel.
- 71 cubic yards of sand.
- 101 barrels of Portland cement.
- 36,000 brick.
- 618 tons of soft coal.
- 13 tons of coke.
- 110 tons of pig lead.
- 82 tons of fire hydrants.
- 623 tons of miscellaneous material.

I again record my appreciation of the cooperation the employees of this division have given each other in the performance of their duties, and the loyal support they have given their chief.

SAM'L RIGGS,
Clerk in Charge of Accounting Division.

The SUPERINTENDENT OF THE WATER DEPARTMENT.

TABLE I.—*Statement of cash account of the water fund, District of Columbia, including appropriations and outstanding obligations, for the fiscal year ended June 30, 1919, as shown by the books of the auditor, District of Columbia.*

Balances July 1, 1918:

Cash in Treasury of the United States	\$192,098.14
Cash in hands of collector of taxes, District of Columbia	308.67
Cash in hands of disbursing officer, District of Columbia	7,373.92
	<u>\$199,780.73</u>

Receipts for the year:

Water rents	782,159.36
Taps and stopcocks	4,810.28
Water main assessments	25,794.88
Interest	2,384.55
Sale of old material	1,482.58
	<u>816,631.65</u>
Repayments for year, including credit transfers	128,498.66
Amount transferred from appropriation emergency fund, Washington Aqueduct, by United States Treasury	833.33
	<u>1,145,744.37</u>

Expenditures for year:

Appropriations, water department, District of Columbia, 1919—	
Salaries—	
Revenue and inspection branch	37,076.30
Distribution branch	43,857.25
Contingent expenses	3,947.68
General expenses	34,560.98
High service	441,892.23
Refunds	1,976.49
	<u>563,310.93</u>
Appropriation, water department, District of Columbia, 1918—	
Salaries, distribution branch	36.67
Contingent expenses	873.65
High service	45,316.05
General expenses	17,086.54
	<u>63,312.91</u>
Appropriation, water department, District of Columbia, 1917—	
General expenses	26.70
High service	12,067.82
	<u>12,094.52</u>
Increase of compensation, water department, District of Columbia, 1919	<u>37,830.63</u>
Total water department expenditures	676,548.99
Advances account appropriations for—	
Washington Aqueduct, District of Columbia, 1919	212,000.00
Increase of compensation, Washington Aqueduct, 1919	10,600.00
Washington Aqueduct, District of Columbia, 1918	25,082.48
Emergency fund, Washington Aqueduct, District of Columbia, 1918	3,915.55
	<u>251,548.03</u>
	<u>928,097.02</u>

Balances June 30, 1919:

Cash in Treasury of the United States.....	\$162,725.53
Cash in hands of collector of taxes, District of Columbia.....	3,223.83
Cash to credit of disbursing officer, District of Columbia.....	51,697.99

	\$217,647.35

	1,145,744.37

Balance in water fund, as stated above.....	217,647.35

Less obligations against appropriations—

Water department, District of Columbia, 1918:

Contingent expenses.....	\$9.10
General expenses	491.90
High service.....	39,428.92

39,929.92

Water department, District of Columbia, 1919:

Contingent expenses.....	194.03
General expenses	4,356.22
High service.....	42,696.69

47,246.94

87,176.86

Unobligated balance, water fund, June 30, 1919..... 130,470.49

TABLE II.—*Cost of work done by the water department for the year ended June 30, 1919.*

Heads of expenditure.	Per diem and salaries.	Material expended, cuts, and transportation.	Total expenditures.	Charged to general account.		Stable accounts, Dr.
				Maintenance.	Extensions.	
Water surveys (detection of leaks).....	\$27,583.53	\$5,878.72	\$33,462.25	\$33,462.25		
Installation and maintenance of meters.....	24,133.64	18,270.47	42,404.11	23,553.38	\$18,550.73	
Office of water registrar.....	5,274.88	6,435.30	64,710.18	64,710.18		
Inspection and repair of services.....	31,924.98	6,664.88	38,589.86	38,589.86		
Tapping water mains.....	2,776.99	1,202.13	3,979.12		3,979.12	
New services installed.....	414.72	2,441.31	2,856.03		2,856.03	
Engineering (field surveys).....	21,204.87	1,097.44	22,302.31	5,664.79	16,637.52	
Stable account.....	17,952.57	6,200.52	24,153.09			\$24,153.09
Operation and repair, valves, fire hydrants, etc.....	20,974.77	4,147.43	25,122.20	25,122.20		
New street hydrants and fountains erected.....	437.61	517.06	954.67		934.67	
Water mains laid.....	21,833.63	59,552.55	81,386.18		81,386.18	
Repairs to leaks.....	19,319.44	8,075.28	27,394.72	27,394.72		
Maintenance of reservoirs, lodges, and towers.....						
Care of grounds.....	2,425.84	1,117.86	3,543.70	3,543.70		
Repayment and special appropriation work.....	6,818.23	234.00	7,052.23	7,052.23		
Replacement work, lowering mains, etc.....	51,710.85	71,684.36	123,395.21		123,395.21	
Plans, estimates and tests.....	6,025.19	11,516.84	17,542.03	17,542.03		
Care of Bryant Street, pumping station.....	12,656.94	47.75	12,704.69	12,704.69		
Operation and repair, pumps, Bryant Street station.....	15,070.33	3,209.33	18,279.66	18,279.66		
Operation and repair, pumps, Reno station.....	47,381.14	64,741.51	112,122.65	112,122.65		
Operation and repair, pumps, Anacostia station.....	4,639.36	2,241.32	6,880.68	6,880.68		
Shopwork.....	6,808.58	1,901.67	8,770.25	8,770.25		
New building.....	19,166.18	12,721.81	31,888.02	16,663.87	15,224.15	
Furnished other District of Columbia offices.....	1,219.95	875.32	2,095.27		2,095.27	
Gross expenditures.....	425,433.19	291,457.68	719,890.87	430,658.90	265,078.88	21,153.09

TABLE II.—*Cost of work done by the water department for the year ended June 30, 1919—Continued.*

SUMMARY.			
Expenditures:	Charged to—	Per cent.	
Per diem pay rolls.....	Maintenance.....	\$430,658.90	61.9
Salary pay rolls.....	Extensions.....	265,078.88	38.1
Total services.....			
Material expended, cuts, etc.....			
Gross expenditures.....	719,890.87		
Less transportation credit.....	24,153.09		
Net expenditure.....	695,737.78	Net expenditure.....	695,737.78 100.0

TABLE III.—*Statement of the distribution system, including mains laid by the United States, the District of Columbia, and on account of repayment work.*

Diameter.	In service June 30, 1918.	Laid dur- ing year ended June 30, 1919.	Abandoned during year ended June 30, 1919.	In service June 30, 1919.
3-inch.....	linear feet.....	82,875	558	17
4-inch.....	do.....	154,386	662	59
6-inch.....	do.....	1,468,176	702	735
8-inch.....	do.....	874,717	22,551	204
10-inch.....	do.....	9,107		9,107
12-inch.....	do.....	381,593	12,401	393,994
16-inch.....	do.....	23,665	1,423	25,088
20-inch.....	do.....	113,036	1,028	114,064
24-inch.....	do.....	26,408	8,358	34,766
30-inch.....	do.....	57,995	5	58,000
36-inch.....	do.....	59,437		59,437
42-inch.....	do.....	23		23
48-inch.....	do.....	44,172		44,172
75-inch.....	do.....	600		600
Total.....		3,296,190	47,688	1,015
				3,342,863
Stop valves.....		10,611	324	70
Fire hydrants.....		3,548	112	50
Public hydrants.....		227	12	6
Sanitary fountains.....		17		17
Horse fountains.....		156		156
Public wells (deep).....		42		42
Public wells (shallow).....		4	1	3

TABLE IV.—*Statement of the length and cost of water mains laid from July 1, 1878, to June 30, 1919, paid from water department funds.*

Diameter.	In service June 30, 1918.	Laid dur- ing year ended June 30, 1919.	Abandoned during year ended June 30, 1919.	In service June 30, 1919.
2-inch.....	linear feet.....	76,822		76,822
4-inch.....	do.....	116,938	221	117,116
6-inch.....	do.....	1,080,102	36	1,080,138
8-inch.....	do.....	817,837	20,007	837,832
10-inch.....	do.....	6,739		6,739
12-inch.....	do.....	340,045	4,749	344,794
16-inch.....	do.....	17,940		17,940
20-inch.....	do.....	102,970		102,970
24-inch.....	do.....	14,494		14,494
30-inch.....	do.....	20,437		20,437
36-inch.....	do.....	38,248		38,248
42-inch.....	do.....	23		23
48-inch.....	do.....	14,309		14,309
Total.....		2,646,904	25,013	55
				2,671,862

Total cost to June 30, 1918..... \$3,051,579.41
 Total cost for year ended June 30, 1919..... 81,386.18

Aggregate cost to June 30, 1919..... 4,032,965.59

REPORT OF THE WATER REGISTRAR.

WASHINGTON, D. C., September 6, 1919.

SIR: I submit herewith the annual report of the revenue and inspection branch of the water department showing in detail the work accomplished during the fiscal year ended June 30, 1919.

INSTALLATION OF WATER METERS.

Owing to the increased cost of meters and material, as well as the scarcity of labor, the work of installation of water meters consisted only of metering services of new houses in some of those sections which had previously been metered.

The number of meters installed during the year was 394 and the number discontinued was 202, making the total now in use 61,299.

The following shows the average cost of installing a meter:

Meter	\$7.75
Material	5.12
Labor	5.96
	18.83

LEAKS AND WASTES.

During the year 20,746 examinations for leaks were made. This included ordinary leaks at house fixtures and the more complicated cases of underground leaks, the detection of which required considerable time and the employment of experienced men.

In all, 71 water services were disconnected at the tap in the main.

The water supply was cut off from 747 houses this year during the period of vacancy, which has resulted in the saving of considerable water, and has prevented the reoccupying of the houses without the knowledge of the office, thereby insuring full payment for the time water was used.

During the year 125 taps and curb cocks were located.

SERVICE CONNECTIONS.

There were 555 new service connections made, inspected, and locations recorded during the year; also 707 repairs, etc., to water services and appurtenances were inspected and recorded.

This work was handled by the regular inspector with some assistance from the office force, and inspections have been made in the majority of cases within one hour of the time specified by the plumber doing the work.

Owing to the reduction in the number of new service connections, the tapper has been used in connection with leaks and wastes and the taking out and replacing of meters, thus keeping these branches of the work up to date. This detail did not occasion any loss of time in connection with the tapping of water mains, and saved the employment of more men in the subdivision to which the assistance was given.

REVENUES.

The table of comparative revenues shows a total collection of \$926,469.02.

There has been an increase in the revenues from water rents this year, which is largely attributable to the small number of vacant houses and the increase in population, necessitating a larger use of water in metered premises.

Table 1 shows statement of collections and expenditures.

Table 2 shows comparative statement of revenues.

Table 3 shows number of meters in service.

Table 4 shows consumption of water in buildings owned or controlled by the District of Columbia.

Table 5 shows consumption of water in charitable institutions, hospitals, etc., which receive an allowance of free water.

Table 6 shows general information.

WATER RATES.

There has been no change in the water rates during the past year. The rate for domestic purposes is charged according to stories and front feet. On all tenements two stories high with a frontage of 16 feet or less, \$5 per annum; for each additional front foot, or fraction thereof greater than one-half, 31 cents. For each additional story or part thereof, one-third of the charges as computed above.

Business premises are rated according to their size, class, volume of business, and water facilities, and rate from \$1 to \$25. If the flat rate on business establishments reaches \$25 or more, the owner or occupant is required to install a water meter at his own expense.

Meter rates.—A minimum rate of \$4.50 is charged against all consumers supplied with water through meters, which allows the use of 7,500 cubic feet of water during the fiscal year, water used in excess of this quantity being charged for at the rate of 4 cents per 100 cubic feet.

CONDITION OF THE WORK.

Notwithstanding the fact that there has been a large increase in business over that of previous years, owing to the growth of the population, the condition was met without any addition to the force and the work was up to date at the close of the year.

This result was obtained by the faithful cooperation of the employees, for which I now take pleasure in expressing my appreciation.

Very respectfully,

GEO. W. WALLACE, Water Registrar.

The SUPERINTENDENT WATER DEPARTMENT.

TABLE 1.—*Statement of collections.*

Water rents:						
Flat rate					\$75,808.29	
Meters					702,690.88	
Building purposes					3,660.19	
Total					782,159.36	
Water main tax, principal and interest					28,179.43	
Taps and stopcocks					4,810.28	
Miscellaneous receipts					1,482.58	
Total					34,472.29	
Total receipts					816,631.65	
Repayment, deposits, and special appropriations					109,837.37	
Total receipts and repayments					926,469.02	

TABLE 2.—*Statement of cash receipts and expenditures of the water fund, District of Columbia, for the fiscal years from June 30, 1903, to June 30, 1919.*

Year.	Water rents.	Water main tax, principal and interest on same.	Taps and stopcocks.	Miscellaneous receipts.	Repayments, deposits, and special appropriations.	Total receipts and repayments balance brought forward.
1903.						\$341,337.37
1904.	\$341,947.53	\$51,713.64	\$6,522.67	\$865.26	\$16,074.20	417,123.30
1905.	352,159.93	32,217.84	8,633.80	2,819.95	27,652.46	423,450.98
1906.	362,256.54	34,395.76	9,100.00	23.60	25,187.61	430,873.51
1907.	468,889.47	51,319.62	9,487.10	6,254.72	10,912.51	555,863.43
1908.	479,981.22	57,402.39	8,888.10	1,373.24	47,084.45	595,492.40
1909.	502,894.45	57,651.06	10,674.15	1,530.08	49,875.59	622,628.33
1910.	509,769.23	76,905.15	11,743.78	1,713.20	26,498.58	626,682.94
1911.	521,581.78	101,987.53	8,824.35	930.04	94,320.49	727,974.19
1912.	545,405.47	122,458.81	11,438.65	2,817.50	110,441.39	792,561.82
1913.	640,008.64	138,693.57	8,685.50	3,153.81	14,923.91	815,465.61
1914.	646,296.15	88,379.21	6,118.20	4,253.20	24,131.64	767,178.40
1915.	638,861.89	66,107.56	6,559.83	3,532.77	14,513.50	729,575.61
1916.	624,882.18	64,647.80	7,020.80	1,761.39	24,669.76	722,981.93
1917.	635,664.31	61,990.43	5,484.62	2,019.58	25,551.56	731,710.50
1918.	714,388.28	34,649.46	3,705.65	458.96	44,391.59	797,593.94
1919.	782,159.36	28,179.43	4,810.28	1,482.58	109,837.37	926,469.02
Total.	8,768,153.43	1,066,762.44	127,518.54	35,024.89	676,166.61	11,014,963.28
1920.	778,000.00	30,000.00	3,000.00	500.00	.....	2,811,500.00
1921.	772,000.00	30,000.00	3,000.00	500.00	.....	2,805,500.00

¹ Estimated.

² Estimated total revenue.

TABLE 3.—*Water meters in use June 30, 1919.*

Name.	$\frac{1}{2}$ -inch.	$\frac{3}{4}$ -inch.	1-inch.	$1\frac{1}{2}$ -inch.	2-inch.	3-inch.	4-inch.	6-inch.	8-inch.	Total.
American.....	151	2	14	4	2					183
American, new model.....	73									73
Crown.....	1	10	30	24	10	8		2		85
Empire.....	39	14	4	2	4	2	1	1		67
Enarc.....		20	28	42	18		1	1		108
Eureka.....										2
Gamon.....	31									31
Gem.....						21	15	8	1	45
Hersey disk.....		601	48	93	26	18	8			794
Hersey, model F.....	21,129									21,129
Hersey torrent.....						1	2	2		5
Hersey detector.....							6	6	9	3
Keystone, Pittsburgh.....		50	50	35	21	27	4			187
Keystone, model W.....	11,953									11,953
King.....	135			4	7	1				147
Lambert.....	944	177	117	111	65	33	7	1		1,455
Lambert special.....	109									409
Lambert glass hd.....	68									68
Nash.....	120	221	355	260	119	44	16			1,135
Niagara.....		72	87	114	64	7				344
Standard.....	1				3					4
Thomson.....	1	6	20	25	18	1	1			72
Trident disk.....	2,231	91	113	101	27	4				2,567
Trident crest.....					1	7	16	1		25
Trident compound.....						3	1			4
Union.....		1	6	2	1				1	11
Worthington.....	221	55	61	53	29	29	7			455
Worthington, model D.....	35									35
Worthington, model G (old).....	75									75
Worthington, model G (new).....	3,291									3,291
Worthington, model K.....	16,511									16,511
Total.....	57,429	1,320	937	876	428	207	78	15	4	61,294
Registers.....										5
Total meters and registers.....										61,299

TABLE 4.—*Showing consumption of water in buildings owned or controlled by the District of Columbia.*

	Annual consumption.	Premises.	Meters.
	<i>Cubic feet.</i>		
Schools and annexes.....	49,827,900	145	150
Fire-engine houses, etc.....	2,261,800	37	37
Police stations.....	3,997,300	13	13
Playgrounds.....	1,156,700	6	6
Public-comfort stations.....	1,861,000	3	3
Stables.....	1,659,200	5	9
Workhouse grounds.....	583,400	7	7
Industrial schools.....	968,600	1	4
Miscellaneous.....	4,823,800	28	35
Total.....	67,139,700	245	264

TABLE 5.—*Premises which receive an allowance of free water.*

Premises.	Consumption.	Allowance.	Exceeded.	Paid.	Meters.	Premises.
	<i>Cubic feet.</i>	<i>Cubic feet.</i>				
Churches.....	3,410,900	6,127,455	15	\$333.57	109	91
Homes.....	4,588,400	3,958,200	9	459.02	32	25
Hospitals.....	12,622,600	10,309,100	4	1,576.26	14	10
Neighborhood houses.....	55,500	658,700			4	3
Orphan asylums.....	2,080,900	1,802,340	2	34.00	12	6
Schools.....	2,287,000	7,502,100	1	188.12	14	12
Total.....	25,045,300	30,357,895	31	2,590.97	185	147

TABLE 6.—*General information.*

Average cost of installing a water meter by the department:

Meter		\$7.75
Material		5.12
Labor		5.96
Total		18.83

Cost of labor and material for maintenance of meters		20,518.26
Average cost per meter for maintenance		.33

Consumption of water through meters:

District meters	cubic feet	626,400,000
District meters, municipal buildings	do	67,139,700
Private meters	do	787,111,500
Private meters in charitable institutions	do	25,045,300

Total		1,505,696,500
-------	--	---------------

Meters in service.	In use June 30, 1918.	Installed, 1919.	Aban- doned, 1919.	Total in use June 30, 1919.
District meters	57,825	335	125	58,035
District meters in municipal buildings	265	1	2	264
Private meters	2,835	55	75	2,815
Private meters in charitable institutions	182	3	—	185
Total	61,107	394	202	61,299

Average cost of reading meters	\$0.20
Average cost of computing and making bills	.18
Average payment for premises in which meters were installed	6.62
Average payment for flat-rate accounts	7.71

Difference	1.09
------------	------

Revenue:

For metered water—	
District of Columbia meters	\$384,362.67
Private meters	318,328.21
	\$702,690.88

For flat-rate accounts:	
Water rents	75,808.29
Building purposes	3,660.19
	79,468.48

Total revenues for the fiscal year 1918	782,159.36
---	------------

Water services:

In use June 30, 1919	70,935
Installed, 1919	555
	71,486

Abandoned, 1919	215
In use June 30, 1919	71,275
Metered	61,443
Not metered	9,832
Percentage of services metered	86

REPORT OF THE SANITARY ENGINEER.

WASHINGTON, D. C., September 1, 1919.

SIR: In submitting this, my twelfth annual report of the several engineering branches under my direction which include the design, construction and maintenance of the sewerage system of the District of Columbia, and the sewage disposal system, with the collateral sanitary studies and the hygienic study of river waters and stream pollution from exterior sources, as well as the layout and arrangement, supervision of construction and recording and mapping of all subsurface construction of public service corporations, I desire to record the highly satisfactory and significant accomplishments of this division of the engineer department during the fiscal year 1919. Notwithstanding the great difficulties encountered throughout the year, due to the disturbed conditions as a result of war, all of these activities were carried on in a systematic and orderly manner, without interruption or neglect in any function, and with such zeal and determination that the sewerage system and the sewage disposal system were actually in better physical condition than at the close of any previous fiscal year.

The increase in load on the sewerage systems due to the vast increase in population as well as to deficient street cleaning and its practical suspension during a great part of the year, with the resulting large volume of accumulated street cleanings washed into the sewers by every rain, were two extraordinary items of maintenance successfully met.

But perhaps more noteworthy is the fact that no prewar contracts were canceled, while at the close of the year every existing contract was either completed or well in progress of completion, including all of the prewar contracts with one exception, and in this exception such notable results were achieved as to merit special record in this report: The James Creek trunk sewer was placed under a contract aggregating a cost of \$22,307.80 early in 1917, but when ordered to begin construction the contractor asked for several postponements on account of war conditions, until finally after long delay the work was readvertised. The lowest bid received was \$44,688, more than double the original price. Considering this war price too large, I recommended rejection and requested authorization to proceed with the work by day labor, with the result that the work was entirely completed within the original contract time, by our own construction forces, although labor and material costs had nearly doubled, and the actual expenditure for this construction was \$22,011.76, including proper charges for equipment used and for all other items, or \$296.04 less than the original contract price, and \$22,676.24 less than the lowest bid under readvertisement. No better evidence of the value and efficiency of the carefully organized construction force of this division could be cited. On the many works of emergency construction undertaken at the request of the War and other Federal Departments during this period, aggregating about \$35,000, praise was received without exception for promptness, efficiency, and economy of construction. In thus recording these substantial evidences, it is a pleasure to acknowledge the loyal and devoted services of the engineering, drafting, clerical, and construction personnel in all of the work throughout the year. It is also worthy of note in this connection that this comparatively small personnel was depleted by the entry of 46 men into the military service and that the sanitary engineer was detailed on work for the War Department during half of this period, and 10 assistant engineers, inspectors, draftsmen, etc., were on service work practically for the entire period.

Owing to the difficulties and delays affecting construction, due to war, which prevailed throughout this and the preceding fiscal year, and the concentration of effort under these adverse conditions toward completing all prior construction contracts, it was found impracticable to make great headway with the authorized construction program for the fiscal year 1919, and, as a result, a large balance of the three principal construction appropriations remained unexpended at the close of the year. The further underlying reason for this condition was the fact that prices bid for construction work had advanced to such figures as to preclude completing a considerable part of these construction projects with the funds available, which were based on estimates submitted two years earlier. How great this advance in prices was may be indicated by the prices bid for digging trenches for sewers and for concrete masonry during the past several years, which were as follows:

	Excavation per cubic yard.	Concrete masonry per cubic yard.
1917.....	\$1.00	\$7.65
1918.....	1.75	8.00
1919.....	2.85	15.40
1920.....	2.80	14.90

That the great advance in the cost of sewer construction as indicated by the above figures with fixed appropriations reduces the amount of sewer construction may be shown by the cost per linear foot of a typical 6-foot diameter sewer at the contract prices bid for each of these years. This cost is as follows:

In 1917, cost per linear foot of 6-foot sewer.....	\$10.62
In 1918, cost per linear foot of 6-foot sewer.....	13.37
In 1919, cost per linear foot of 6-foot sewer.....	24.40
In 1920, cost per linear foot of 6-foot sewer.....	23.40

Showing that from 1917 to 1920 the cost has increased 220 per cent and that but 45 per cent of the work done under 1917 prices could be done under 1920 prices, with equal appropriations for both years. But the essential work of this division has been further reduced by the allowance of far less funds for 1920 than were allowed for 1917. Under the 1917 appropriation a total of \$425,000 was allowed for the three principal construction appropriations, and for 1920 but \$267,000 was allowed, or 62.8 per cent of the 1917 funds. This reduction in funds and the above increase in cost of construction indicate that only about 35.6 per cent of the normal work, as submitted in estimates for 1920, can be constructed during the fiscal year 1920.

The details of the work of this division are given in the following sections, with accompanying tables appended thereto.

ASA E. PHILLIPS, *Sanitary Engineer.*

THE ASSISTANT TO THE ENGINEER COMMISSIONER.

SECTION A.—ENGINEERING DATA, DESIGNS, AND DRAINAGE STUDIES.

The engineering data for the year included rainfall, run-off, and river flow records, as well as the determination of the oxygen content of the river waters as a check on the effect of the present discharge of untreated sewage from the District of Columbia into the Potomac River. The laboratory work on these tests is done by the United States Public Health Service, and acknowledgments are due for valuable assistance in securing this data.

METROPOLITAN SEWERAGE PROJECT.

The metropolitan sewerage project, which contemplates the removal of all sewage from Maryland towns now entering small streams which flow into and through the national parks in the District of Columbia, provides for connecting the Maryland interceptors to be laid along the lines of these streams with the sewage-disposal system of the District of Columbia. While the work of completing the necessary interceptors within the District is far advanced, no actual construction has been begun by the sanitary commission organized by the State of Maryland of the interceptors within the State and no beneficial results can accrue under the authority granted by Congress and by the State until these Maryland interceptors are built. Meanwhile, the serious contamination of park streams by the discharge of raw sewage from these Maryland towns is increasing, and bacteriological examinations of the waters of the streams indicate that their purity is so affected as to render the spread of water-borne disease probable by children in the parks playing in these streams.

While war conditions unquestionably have had the effect of delaying the sewerage construction necessary to eliminate this stream pollution, it is be-

lieved that construction by the State should be begun without further delay in the interests not only of the national parks within the District of Columbia, but also in the interests of the Maryland communities themselves which are polluting these small streams at their very doors.

This project was originally proposed in my annual report for the fiscal year 1909, from which the following is abstracted:

"The only practical solution of this problem is believed to be in the formation of a metropolitan district, under the control of a State and national board, with power to construct the necessary valley interceptors for the removal of the sewage, and that these interceptors be arranged so as to discharge at the State line into the interceptors of the sewage-disposal system of the District of Columbia, the District to be reimbursed for the cost of pumping and handling the sewage from the Maryland towns and villages by a State-collected tax levied upon the communities benefited, which would also defray the cost of construction and maintenance of the State system."

RIVER CONDITIONS AS TO SEWAGE DISPOSAL.

The condition of the river waters in the vicinity of the main outfall and below was generally very good throughout the year, the beaches were free from any evidence of sewage discharge, and the surface waters clear of the sleek produced by the oily wastes. The drop in oxygen content, however, below 50 per cent for the first time in the history of the disposal works may be considered as a warning that the installation of primary treatment works can not be safely deferred for a much longer period. Under appropriation already made, the site for these treatment works is now being acquired, and within the next 12 months it is proposed to submit estimates for beginning construction.

Oxygen tests are made to determine the condition of the river waters in the vicinity of the main sewage outfall, and for comparison similar tests are made on samples of upper river water above the area considerably affected by discharge from the sewerage system.

The following table gives the maximum, minimum, and mean oxygen content for each month of the fiscal year and the similar record for the two preceding years:

Comparative oxygen tests of samples of Potomac River water taken near main sewage outfall and from the upper river for the past three fiscal years.

Fiscal year.	Location of samples taken on Potomac River.	Oxygen per cent saturation.											
		July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.
Mean:													
1917	Dilution basin..	87	77	73	74	74	90	100	(1)	100	97	79	83
	Upper river.....	93	93	88	95	98	100	100	(1)	99	98	96	96
1918	Dilution basin..	64	65	70	64	(1)	91	(1)	(1)	(1)	(1)	(1)	(1)
	Upper river.....	87	90	92	94	(1)	97	(1)	(1)	(1)	(1)	(1)	(1)
1919	Dilution basin..	(1)	70	74	63	82	88	(1)	(1)	(1)	90	91	(1)
	Upper river.....	(1)	74	90	89	92	96	(1)	(1)	(1)	98	97	(1)
Minimum:													
1917	Dilution basin..	78	74	63	65	65	83	100	(1)	97	94	60	73
	Upper river.....	87	87	81	91	97	100	100	(1)	100	96	92	92
1918	Dilution basin..	43	55	55	59	(1)	91	(1)	(1)	(1)	(1)	(1)	(1)
	Upper river.....	81	86	89	84	(1)	97	(1)	(1)	(1)	(1)	(1)	(1)
1919	Dilution basin..	(1)	45	52	62	76	82	(1)	(1)	(1)	86	88	(1)
	Upper river.....	(1)	49	95	92	95	95	(1)	(1)	(1)	96	95	(1)
Maximum:													
1917	Dilution basin..	96	80	84	84	84	98	100	(1)	100	94	60	73
	Upper river.....	87	87	95	91	97	100	100	(1)	100	96	92	92
1918	Dilution basin..	43	55	55	59	(1)	91	(1)	(1)	(1)	(1)	(1)	(1)
	Upper river.....	81	86	89	84	(1)	97	(1)	(1)	(1)	(1)	(1)	(1)
1919	Dilution basin..	(1)	87	93	72	85	95	(1)	(1)	(1)	98	95	(1)
	Upper river.....	(1)	84	95	92	95	98	(1)	(1)	(1)	100	99	(1)

¹ Sampling interrupted.

The following is a tabulation of the flow of the Potomac River for each month of the year together with the average discharge through the outfall. The latter includes considerable storm water, ground water, and stream flow from suburban areas, as well as leaks and wastes of the water-supply system.

The actual ratio to river flow is given in this tabulation, as well as the ratio of effective dilution obtained:

River flow and dilution ratio.

Month.	Year.	River flow.			Outfall discharge.	Ratio of mean pumpage to mean river flow.	Effective dilution obtained. ¹
		Maximum.	Minimum.	Mean.			
July.....	1918.	Second-feet.	Second-feet.	Second-feet.	Second-feet.	1:39	91:1
August.....		6,100	2,710	4,220	106		
September.....		4,550	2,875	3,700	112	1:33	97:1
October.....		8,750	2,490	4,956	107	1:46	107:1
November.....		5,000	1,350	2,208	102	1:23	46:1
December.....		14,000	2,580	7,240	105	1:69	156:1
		53,750	3,225	18,265	102	1:179	393:1
January.....	1919.						
February.....		62,500	9,160	18,408	105	1:175	400:1
March.....		13,750	5,250	7,482	95	1:79	161:1
April.....		33,500	8,650	15,554	104	1:150	335:1
May.....		17,625	6,725	11,159	120	1:93	241:1
June.....		83,875	5,840	22,861	116	1:175	492:1
		17,625	5,010	8,760	109	1:80	189:1

¹ This column indicates the ratio of mean river flow to sewage, rated at 30 gallons per capita per day for the contributing population.

During the past 12 months the river flow has fallen below 1,400 second-feet on 1 day, below 1,600 second-feet on 4 days, below 1,800 second-feet on 7 days, below 2,000 second-feet on 15 days. The minimum flow was 1,350 second-feet on October 20, 1918, and the maximum flow was 80,875 second-feet on May 12, 1919. The mean flow for the year was 10,440 second-feet. The minimum flow for the preceding year was 800 second-feet, the maximum flow 139,000 second-feet, and the mean flow 11,000 second-feet.

Average flow Potomac River in second-feet.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1915.....	34,368	33,853	10,341	5,449	7,350	25,398	3,343	8,418	6,668	8,820	4,500	8,332
1916.....	15,285	19,416	31,126	24,892	9,983	17,625	8,958	4,578	3,015	2,849	1,940	3,766
1917.....	11,600	9,321	39,309	10,018	7,020	8,849	4,830	3,370	1,700	6,000	4,780	3,630
1918.....	(1)	49,990	16,030	50,230	7,760	4,150	4,220	3,700	4,956	2,298	7,240	18,265
1919.....	18,498	7,482	15,550	11,160	22,860	8,760	.....	.....	.....	.....	.....	.....

¹ No record on account of ice.

RAINFALL AND RUN-OFF.

Data for run-off studies includes rainfall records from 3 automatic and 21 ordinary rain gauges, distributed over 50 square miles of area, as well as discharge and flow-line observations for excessive storms in a number of the main drainage lines.

But three storms of exceptional intensity occurred during the year. The maximum was on June 27, 1919, beginning at 12.20 p. m. and lasting 35 minutes, when 1.48 inches were recorded at Twenty-fourth and M Streets NW., with a maximum rate of 4.92 inches per hour for a 20-minute period.

Excessive storm of June 27, 1919.

DEPTH OF PRECIPITATION.

[Depth in inches at time indicated.]

Gauge.	12.20	12.25	12.30	12.35	12.40	12.45	12.50	12.55
No. 4, Twenty-fourth and M Streets NW.....	0.00	0.39	0.87	1.23	1.32	1.37	1.46	1.48
No. 19, First and O Streets SE.....	.00	.00	.00	.25	.79	.87	.93	.93
No. 16, Twenty-first and A Streets NE.....	.00	.00	.00	.00	.13	.35	.42	.48

Excessive storm of June 27, 1919—Continued.

UNIT DEPTHS OF PRECIPITATION.

[Depth in inches for each 5-minute period.]

Gauge.	12.20 to 12.25	12.25 to 12.30	12.30 to 12.35	12.35 to 12.40	12.40 to 12.45	12.45 to 12.50	12.50 to 12.55
No. 4, Twenty-fourth and M Streets NW.....	0.39	0.48	0.36	0.09	0.05	0.09	0.10
No. 10, First and O Streets SE.....	.00	.00	.25	.54	.08	.06	.06
No. 16, Twenty-first and A Streets NE.....	.00	.00	.00	.13	.22	.07	.06

RATE OF PRECIPITATION.

[Rate in inches per hour during periods of time indicated.]

Gauge.	5 min- utes.	10 min- utes.	15 min- utes.	20 min- utes.	25 min- utes.	30 min- utes.	35 min- utes.
No. 4, Twenty-fourth and M Streets NW.....	4.68	5.22	4.92	3.96	3.29	2.92	2.92
No. 10, First and O Streets SE.....	.00	.00	3.00	4.74	3.48	2.79	2.79
No. 16, Twenty-first and A Streets NE.....	.00	.00	.00	1.56	2.10	1.68	1.44

The following tabulations give the total rainfall for the three excessive storms as recorded at each of the 24 gauges and the annual rainfall by months:

Tabulation of the total observed rainfall for the three excessive storms of the fiscal year 1919 as recorded at 24 stations.

Station No.	Location.	Radial distance in miles.	Total rainfall.		
			July 12, 1918.	July 25, 1918.	June 27, 1919.
1	Pennsylvania Avenue and Thirteenth Street NW.....	0.00	1.37	1.61	1.62
2	Tenth and G Streets SW.....	.40	1.70	.60	1.15
3	Seventeenth and K Streets NW.....	.60	1.00	1.38	1.40
4	Twenty-fourth and M Streets NW.....	1.20	1.04	1.08	1.46
5	Delaware Avenue and C Street NE.....	1.20	1.75	.50	
6	New York Avenue and New Jersey Avenue NW.....	1.20	1.12	.90	1.42
7	Seventeenth and U Streets NW.....	1.40	1.32	1.58	1.45
8	North Carolina Avenue and Seventh Street SE.....	1.90	1.88	.62	1.25
9	Rock Creek and Massachusetts Avenue NW.....	2.00	1.58	.92	.90
10	First and O Streets SE.....	2.10	1.15	.82	1.25
11	Dens Place and Thirty-fifth Street NW.....	2.20	1.75	.50	1.19
12	Filtration plant.....	2.20	1.32	1.58	1.20
13	Maryland Avenue and Thirteenth Street NE.....	2.30	1.88	.55	1.42
14	Zoological Park.....	2.40	1.50	.90	1.06
15	Park Road and Holmead Place NW.....	2.40	1.88	.92	(1)
16	Twenty-first and A Streets NE.....	3.00	.90	.80	.70
17	Fourteenth and V Streets SE.....	3.00	1.25	.75	.70
18	Twelfth and Monroe Streets NE.....	3.30	1.20	.62	.55
19	Fourth Street and Nichols Avenue SE.....	3.90	.78	1.62	
20	Nebraska Avenue and Tunlaw Road NW.....	4.20	1.50	.90	(1)
21	Georgia Avenue and Nicholson Street NW.....	4.40	.78	.55	(1)
22	Minnesota Avenue and Gault Place NE.....	4.70	1.38	1.60	1.25
23	Conduit Road and Little Falls Road NW.....	5.10	.94	.90	.38
24	Great Falls, Md.....	16.00	.80	.80	.27

¹ No record.

The precipitation by months for the fiscal year was recorded as follows:

1918.		Inches.	Inches.
July	-----	3.79	February ----- 2.01
August	-----	1.88	March ----- 4.02
September	-----	2.79	April ----- 3.71
October	-----	.86	May ----- 5.27
November	-----	1.48	June ----- 3.44
December	-----	4.65	Total ----- 37.37

1919.		Inches.
January	-----	3.47

TIDAL RANGE.

The automatic recording gauge located at the main sewerage pumping station, on the Anacostia River, about $1\frac{1}{2}$ miles above its junction with the Potomac River, indicated the following for the fiscal year: Maximum high water, October 26, 1918, +2.4 feet (District of Columbia datum) or 1.7 feet above normal; minimum low water, November 24, 1918, -5.1 feet (District of Columbia datum) or 2.9 feet below normal.

The maximum range of tide for each month of the fiscal year was as follows:

Maximum monthly range of tides.

1918.		Tide range in feet.	1919.		Tide range in feet.
July	-----	4.1	January	-----	4.6
August	-----	4.1	February	-----	4.4
September	-----	4.5	March	-----	5.4
October	-----	4.4	April	-----	4.9
November	-----	7.1	May	-----	3.8
December	-----	4.6	June	-----	4.3

Studies of new areas for both storm and sanitary drainage for future development of the sewerage system were continued throughout the year; these advance studies for new trunk lines and important extensions in undeveloped areas are kept well in advance of actual construction, as a means of economic and foresighted planning. For more immediate construction, sanitary drainage and separate system studies were made for new areas in Petworth, Sixteenth Street Heights, Pinehurst, Chevy Chase, and Massachusetts Avenue extended; while for storm drainage studies were made for new areas in north Petworth, Kingley Ford Valley, Luzon Valley, Spring Road, Broad Branch Valley, Benning, and Congress Heights. In the older portions of Washington, where existing sewers are inadequate or sanitarily obsolete, studies for improving the drainage system were continued, and in the more urgent cases new sewers were constructed as far as conditions permitted. Detail construction plans were prepared for Reno Road, East Brookland, Kingley Valley, and Luzon Avenue trunk sewers, and for the extension of the sanitary concrete cunette invert, replacing the old wood floor in the large 30-foot span Tiber sewer.

Contract plans, specifications, and proposals were prepared for trunk sewers in Illinois Avenue from Gallatin to Webster Streets NW.; Minnesota Avenue from Seventeenth Street to Good Hope Road SE.; Seaggs Branch from Thirty-fourth Street to the Philadelphia, Baltimore & Washington R. R. NE.; Upper Piney Branch from Fourth and Butternut to Third and Aspen Streets NW.; also for relief sewers in Ninth Street NE.; Twelfth Street SE., and T Street NW.

In connection with the sewage-disposal system, designs were prepared for special construction for the upper Potomac interceptor and for new sections of this important intercepting sewer, as well as for special construction on the Anacostia main interceptor at the Seaggs Branch crossing. The Rock Creek pumping station was designed and detailed plans and specifications prepared for the substructure and for the mechanical equipment. This station will be electrically operated with automatic control so as to reduce the expenditure

for attendants to a minimum. It will have an initial capacity of 15,000,000 gallons daily, delivering the entire sanitary flow from the Potomac River Valley above Rock Creek to the sewage-disposal system.

Throughout the year the underground construction work of the public-service corporations was supervised, notwithstanding the limitations heretofore referred to, and all such construction accurately recorded and mapped. Details of this work are set forth under section G of this report. In addition, excellent progress was made on the underground survey and the mapping of all subsurface structures on large scale original maps, 44 sheets of this standard set of maps having been completed to date.

The daily records of the maintenance and operation of the sewerage system and the sewage disposal system, as well as of the pumping stations and mechanical plants, have been carefully analyzed and the results tabulated in the comparative daily and annual statements recorded. These studies are made with a view of checking the efficiency and economic results in both operation and maintenance of the various working units. The comparative study of unit costs of construction and operating costs furnishes the only reliable index of the continued efficiency of the various units and is a check on performances as well as indicative of any economic adjustments required in the several organizations. Record charts of daily water consumption by the mechanical plants are prepared and the results analyzed with a view of limiting the consumption to the least possible draft on the city water supply consistent with proper sanitary maintenance. Records on the card system show the daily motor, pumping, engine, and boiler service results in connection with coal and electric current consumption as a check on the efficient upkeep of the mechanical plants.

Recapitulation of the sewerage system and sewage-disposal system.

Constructed during the fiscal year 1919:

Main sewers-----	miles	2.82
Pipe sewers-----	do	5.16
Total-----	do	<u>7.98</u>

Mileage in service June 30, 1919:

Main sewers-----	miles	147.79
Pipe sewers-----	do	591.03
Total-----	do	<u>738.82</u>

Expended for construction during fiscal year 1919:

Sewerage system-----	\$282,028.55
Sewage-disposal system-----	\$83,337.33
Total-----	<u>365,365.88</u>

Total expenditures for construction to June 30, 1919:

Sewerage system-----	\$14,231,065.00
Sewage-disposal system-----	4,803,662.25
Total-----	<u>19,034,727.25</u>

SECTION B.—OPERATION AND MAINTENANCE, SEWERAGE SYSTEM.

The maintenance work of the year included the inspection of all main trunk sewers, 147.79 miles in length, and the inspection of 978.50 miles of pipe sewers. General repairs were made throughout the system on both main and pipe sewers, and their condition as to maintenance was excellent. The most important betterment was the construction of 768 linear feet of concrete floor in the 30-foot span old Tiber sewer in canal between Second Street and Maryland Avenue SW. Substantial repairs were made to the concrete and brick masonry of the following important trunk sewers: Northeast boundary; B

Street and New Jersey Avenue; Tiber Creek; Indiana Avenue; I Street NW; Twelfth Street SE., and the Ninth Street SE trunk sewers. A new concrete spillway and apron was constructed in front of the storm water outlet of the Piney Branch trunk sewer; also a stone retaining wall was constructed along the water side of the Rock Creek interceptor near P Street, to secure the stability of this portion of the structure.

The operating work for the fiscal year included the cleaning of 27,867 storm-water catchment basins on permanently paved streets and 5,119 catchment basins on suburban streets and roads. The total quantity of silt removed from the city basins was 4,909 tons and from suburban basins 3,466 cubic yards. This is an increase of 792 tons from city basins and a decrease of 1,180 cubic yards from the amount removed from suburban basins during the preceding fiscal year. The cost of cleaning city basins, including the cost of labor and team haul, but exclusive of disposal, was \$17,561.26, and the cost of cleaning suburban basins was \$5,453.09, a total of \$23,014.35. The average cost of cleaning city basins was \$0.63 per basin, as against \$0.436 per basin, the cost for the preceding year, and the average cost per ton of silt removed was \$3.58, as against \$2.74, the cost for the preceding year. The average cost of cleaning suburban basins was \$1.065 per basin, as against \$0.757 per basin, the cost for the preceding year, and the average cost per cubic yard of material removed was \$1.573, as against \$0.757, the cost for the preceding year. All material from the city basins was delivered aboard scows, removed from the city front, and deposited as fill back of the bulkhead line of the Anacostia River improvement, between Poplar Point and Giesboro Point, under permit from the United States Engineer Office. The cost of this disposal, including loading on scows, water transportation, unloading and grading, was \$7,875.25, and the average cost of this work per ton removed was \$1.604, as against \$0.943, the cost per ton during the preceding year.

A total of 7,121 cubic feet of material was removed from sewers and 51,435 cubic feet from the settling chamber of the sewage disposal system; 940,348 pounds of screenings were removed from the sewage screens and incinerated.

The following tabulation indicates the total length of sewers at the close of the fiscal year and gives the length and expenditure for 20 years for operation and maintenance, based on the total appropriation for this work, but exclusive of sewage disposal maintenance. This tabulation indicates a reduction in annual expenditure per mile for operation and maintenance in the past 20 years from \$122.52 to \$67.76. This reduction in cost has been accompanied by increasingly thorough maintenance work and is solely due to developments in efficiency and economy of this important branch of the service.

Year.	Length of sewers.	Expenditure for maintenance.	Cost of maintenance per mile.	Year.	Length of sewers.	Expenditure for maintenance.	Cost of maintenance per mile.
	Miles.				Miles.		
1900	408.08	\$50,000	\$122.52	1910 ¹	567.98	\$48,500	\$85.39
1901	421.34	50,000	118.67	1911 ¹	589.74	50,000	84.70
1902	436.89	50,000	132.76	1912 ¹	618.53	50,000	80.84
1903	448.09	58,000	129.44	1913 ¹	644.28	50,000	77.61
1904	456.87	58,000	126.95	1914 ¹	661.49	50,500	76.30
1905	468.86	58,000	123.70	1915 ¹	682.11	50,000	74.03
1906	484.40	42,000	86.70	1916 ¹	702.06	50,000	71.22
1907 ¹	501.44	38,000	75.78	1917 ¹	717.38	50,000	69.69
1908 ¹	521.18	44,500	85.38	1918 ¹	730.84	50,000	68.41
1909 ¹	542.03	45,000	83.02	1919 ¹	737.90	50,000	67.76

¹ Exclusive of sewage disposal system.

There are now 737.90 miles of main and pipe sewers and 5,958 catchment basins. The work of operation and maintenance includes the inspection, flushing, cleaning, and repairing of all sewers and appurtenances. The record of cost of all work performed, including comparative costs with preceding years, together with an accurate daily statement of work performed, is maintained on the card system.

The following summary gives a statement of the amount of work in this division for the fiscal year, with details of expenditure for each class of work performed:

Cleaning and repairing, fiscal year 1919.

		Work.	Cost.
CLEANING AND INSPECTION.			
Inspection interior of all main sewers.....	miles.	737.90	\$1,451.50
Inspection of pipe sewers.....	do.	978.50	
Flushing of pipe sewers.....	feet.	5,166,538	3,762.34
Flushing of manholes.....		13,032	
Flushing of storm-water receiving basins.....		21,322	1,414.80
Inspection and cleaning of gates, regulators, and sumps.....		4,284	2,791.70
Cleaning of main sewers.....	feet.	4,043	1,525.00
Cleaning of pipe sewers.....	do.	175,917	7,142.42
Cleaning of basin outlets.....		38	
Cleaning of gravel basins.....		5	140.33
CLEANING OF STORM-WATER RECEIVING BASINS.			
City basins.....		27,867	
Labor.....			5,421.26
Teams.....			12,140.00
Total.....			17,561.26
County basins.....		5,119	
Labor.....			1,914.81
Teams.....			3,538.25
Total.....			5,453.09
Removal by scows:			
Loader.....			2,530.28
Transportation.....			2,194.87
Unloader.....			3,150.10
Total.....			7,875.25
Total cleaning of storm-water receiving basins.....			30,889.60
Cleaning sediment chamber.....			2,878.89
Cleaning of screens.....			6,182.37
Silt removed from main sewers.....	cubic feet	2,082	
Material removed from pipe sewers.....	do.	4,702	
Silt removed from gravel basins.....	do.	337	
Silt removed from storm-water receiving basins, city.....	tons	4,909	
Silt removed from storm-water receiving basins, county.....	cubic yards	3,466	
Silt removed from sediment chamber, main sewerage pumping station.....	cubic feet	51,435	
Material removed from screens at main sewerage pumping station.....	pounds	940,348	
REPAIRS.			
Relying pipe sewers and basin connections.....	feet.	240	862.28
Abandoning pipe sewers.....	do.	30	8.04
Special large connections to pipe sewers.....	do.	19	277.25
Repairing main sewers.....			728.55
Inspection and repairs to house connections to main sewers.....		62	125.00
Settlements filled.....		6	248.03
Reconstruction of manholes.....		5	382.96
Adjusting and repairing manholes.....		69	1,101.80
Abandoning manholes.....			
Replacing manhole frames.....		32	
Replacing manhole covers.....		48	724.15
Reconstruction basins.....		8	216.63
Adjusting and repairing basins.....		146	2,494.34
Abandoning basins.....		3	18.28
Replacing alley grates.....		9	
Replacing alley frames.....		9	247.48
Miscellaneous work.....			5,678.98

SECTION C.—OPERATION AND MAINTENANCE, SEWAGE-DISPOSAL SYSTEM, PUMPING STATIONS, SHOPS, AND YARDS.

Under this division is included the operation and maintenance of the main pumping station, also of substations, gates, and regulators; the mechanical equipment of the sewer division, shops, stores, yards, and floating equipment, as well as the installation of mechanical apparatus and special construction.

The main sewerage pumping station was in continuous operation throughout the year handling the sewage of practically the entire District, as well as all storm water from the 900-acre low area within the dike lines. The various pumping services were operated without interruption, and the preestablished hydraulic levels, both for sewage and storm water, were maintained without

variation, both under normal conditions and throughout all storm periods. As an indication of the adequacy in design, construction, and operation of these works, it is to be noted that throughout the period of more than 12 years since they were put in service there has not been a single case of flooding in the 900-acre low area section within the dike lines or the interruption for a single minute in that period, of any of the various pumping services.

Main pumping station.—Sewage to the amount of 25,388,879,000 gallons and 865,155,000 gallons of storm water were pumped during the year, an increase of 1,713,879,000 gallons of sewage over the quantity pumped during the previous fiscal year.

The following is a tabulation of total pumpage by sewage pumps and storm-water pumps for each month of the fiscal year:

Total pumpage in gallons at the main sewerage pumping station.

Month.	Sewage.	Storm water.	Month.	Sewage.	Storm water.
1918.					
July.....	2,133,612,000	75,446,000	January.....	2,108,080,000	192,805,000
August.....	2,253,787,000	31,000,000	February.....	1,785,568,000	74,114,000
September.....	2,091,916,000	25,274,000	March.....	2,096,748,000	47,365,000
October.....	2,039,303,000	17,053,000	April.....	2,336,055,000	54,673,000
November.....	2,040,162,000	32,648,000	May.....	2,337,561,000	157,534,000
December.....	2,046,036,000	94,423,000	June.....	2,120,021,000	62,817,000

The expenditure of coal and other supplies for the year was as follows: Coal, 11,315,785 pounds; cylinder oil, pumping engine, 1,543 gallons; gas engine, 319 gallons; engine oils, 1,704 gallons; miscellaneous oils, 83 gallons; engine grease, 560 pounds; illuminating oil, 1,757 gallons; gasoline, 10,955 gallons. This latter includes all usage of the department during the fiscal year. There were 2,003 pounds of cotton waste used and 700 pounds washed and reused.

Poplar Point pumping station.—The Poplar Point pumping station, located at the foot of Howard Avenue, was operated continuously throughout the year, handling all the sewage from the east side of the Anacostia River and discharging same into the main outfall of the sewage disposal system.

A total of 469,052,000 gallons of sewage was pumped during the year, a decrease of 108,748,000 gallons over the quantity pumped during the previous fiscal year. The following is a tabulation of the quantities pumped during each month of the fiscal year:

Total pumpage at the Poplar Point pumping station for the year.

Month.	Gallons.	Month.	Gallons.
1918.			
July.....	29,008,000	January.....	52,568,000
August.....	26,507,000	February.....	37,351,000
September.....	28,701,000	March.....	40,988,000
October.....	27,093,000	April.....	57,690,000
November.....	24,269,000	May.....	64,108,000
December.....	31,786,000	June.....	48,983,000

The expenditure of coal at the Poplar Point station in the combined heater and incinerator was 77,142 pounds, while 87,754 pounds of waste were removed from the screens and incinerated.

Woodridge substation.—The Woodridge substation was operated continuously throughout the year, handling all the sewage from the vicinity of Woodridge, D. C., and discharging same into the east side interceptor of the sewage disposal system.

Sewage to the amount of 14,519,000 gallons was pumped during the year. This is an increase of 8,086,300 gallons over the quantity pumped during the previous fiscal year. The current used was furnished by the Potomac Electric Power Co. at a rate of \$0.06 per kilowatt hour. The average cost of pumpage for the year was \$0.90 per million foot-gallons.

The following is a tabulation of the quantities pumped during each month of the year:

Total pumpage at the Woodridge substation for the year.

Month.	Gallons.	Month.	Gallons.
1918.			
July.....	1,055,000	January.....	1,024,300
August.....	918,300	February.....	1,143,500
September.....	987,800	March.....	1,698,800
October.....	987,400	April.....	1,713,000
November.....	989,600	May.....	1,105,000
December.....	1,347,700	June.....	1,548,600

The following are items of repair and betterment for the year:

Poplar Point pumping station.—The electric equipment and pumping units were regularly inspected and necessary repairs made throughout the year. The electric level indicators were overhauled and two switches replaced on same; also the dynamotors were overhauled.

Woodridge substation.—At the Woodridge substation, a new 3-inch, vertical, submerged pump, driven by a 10-horsepower, 25-cycle, 3-phase motor was installed, together with a new switchboard and two 3-pole alternating current circuit breakers. Unit No. 1 was thoroughly overhauled and equipped with new impeller shaft. New pipe lines were installed for both old and new pumping units and improvements made in the automatic control.

Main pumping station.—At the main pumping station, two new screens were made and installed on the intake main. Conduits were laid, new cables installed, and switch panel built for the emergency break-down electric power connection between this station and the electric plant in the United States navy yard. A dynamotor stand, with switchboard, was installed for operating the electric level indicators and the automatic stops on the generator engines. A new armature was installed on one of the motors in the machine shop and a new armature and controlling rheostat on the blacksmith shop forge and on the drill press motor. The receiving tower on the coal-handling plant was painted.

Valve bearings were refitted on engines Nos. 1, 2, and 3, Class I, connecting rod bearings renewed on engine No. 2, and oil guard ring of thrust bearing renewed on engine No. 3. Condenser pump No. 1 was overhauled and repaired, steam valves adjusted, and new valve stem made and installed, and condenser pumps No. 2 and No. 3 overhauled and repaired. Pump bearings were re-babbitted on the 3-inch electric drainage pump and a new impeller shaft installed. Risers and loops to 4 pumping engines and the steam main lines and valves in the generator room were recovered, and a 7-inch gate valve was placed on the main steam line.

In the boiler room, fire brick arches and walls were renewed in furnace of boiler No. 6 and arches rebuilt in furnaces Nos. 1, 2, and 5; bridge walls in furnaces Nos. 3 and 5; and side, center, and cross walls rebuilt in furnaces Nos. 1, 2, 3, 4, 5, and 6. One hundred new boiler tubes were installed. New ash pit aprons were installed and masonry repaired in all ash hoppers; also 3 ash pit walls rebuilt; grate bearer I beams renewed in 3 ash pits and 6 new dumping grates installed. All boiler blow-off valves and feed lines to all boilers were covered. The economizer was thoroughly overhauled, tubes cleaned and scraped; packing in 77 manifold and header joints was renewed, and 37 interior lids were replaced.

Stores.—All supplies, construction materials, and tools purchased during the year were received, inspected, and issued at storerooms and yards. An accurate daily record was kept on the card system and semiannual report made covering all expendable and unexpendable property. An inventory of all property is taken annually in order to verify the accounts and close the records for the year. All property, tools, and equipment unfit for further use were invoiced by the auditor's office for condemnation and sale.

Yards.—At the concrete plant in the First Street yard, 111 side basin tops, 120 corner basin tops, 210 cheek blocks, and 64 drip stones were made during the year. All silt removed from storm-water catchment basins was weighed and loaded on scows at this yard.

A new governor was installed on the gasoline unloader, derrick and electric tender cleaned and painted, and wharf repaired. A new landing was built for the marine railway, pile driver repaired, and a new base built for same. Minor repairs were made on railway trestle in the Poplar Point storage yard, where materials for use on sewer construction and repair work east of the Anacostia River are stored and issued.

The portable steam derrick was completed and equipped with Ledgerwood hoisting engine and Lambert rotary boom swinger.

Ink sludge collected in the settling basins, designed and built by this department, at the Bureau of Engraving and Printing was removed and disposed of by this division. These basins have operated with the most satisfactory results in preventing stoppage of the public sewers by this troublesome waste. Prior to their construction, large sums were expended in relaying sewers almost completely obstructed by these sludge deposits. The amount of this material removed and the cost of disposal is given in the following tabulation, the actual cost of the work being reimbursed by the Bureau of Engraving and Printing:

Material removed and the cost of cleaning the ink-settling basins of the Bureau of Engraving and Printing.

Date of cleaning.	Tons removed.	Unit cost removal per ton.	Unit cost team haul per ton.	Unit cost transportation and disposal per ton.	Total cost removal, transportation per ton.	Total cost removal and disposal.
1918.						
Aug. 22.....	39.3	\$1.90	\$1.08	\$1.21	\$3.11	\$134.44
Sept. 19.....	11.8	1.81	1.06	1.20	3.01	138.63
Oct. 24.....	45.9	2.40	1.33	1.36	3.76	190.04
Nov. 27.....	34.6	2.03	1.18	1.22	3.25	122.60
December.....	50.3	2.10	1.03	1.17	3.27	182.71
1919.						
Jan. 21.....	52.5	2.11	1.15	1.26	3.37	195.25
Feb. 13.....	35.8	2.40	1.41	1.32	3.72	146.63
Mar. 10.....	45.5	2.22	1.14	1.25	3.47	164.16
Apr. 14.....	37.9	2.09	1.07	1.19	3.28	136.95
May 22.....	44.2	2.04	1.17	1.30	3.34	162.42
June 12.....	34.0	2.48	1.32	1.27	3.75	144.03
Total and average.....	461.8	2.14	1.18	1.25	3.39	1,717.86

Floating equipment.—The floating equipment was engaged in transporting materials removed from the sediment chamber and from storm-water catchment basins throughout the city to their points of disposal; in conveying construction materials to points along the water front where sewer work was in progress; in the transportation of chemists in connection with the sanitary survey of the Potomac River and in the transportation of inspectors and assistant engineers. The towboat *Virginia* was thoroughly overhauled and repaired and painted. Minor repairs were made to the launch and to five scows.

Shops.—In addition to the work of this division, enumerated in preceding paragraphs, the work of the shops included all repairs to pumping and other machinery, cleaning and painting wagons, motor trucks and construction equipment, minor repairs for maintenance and betterment of buildings, and the maintenance of electric lighting and power circuits. Twelve basin cleaning wagons, 3 hose reels, 17 wagons, and 4 carts were repaired; also 15 basin cleaning wagons, 1 hose reel, and 12 wagons were thoroughly overhauled and painted. Two autos were overhauled and one auto painted. Small tools were made as follows: Four chisels, 51 drills, 33 points, 32 wrenches, 219 picks, 9 cold cutters, 1 hammer, 1 set manhole lifters, 17 signs, and 67 miscellaneous tools. Small tools were repaired as follows: One hundred and ninety-six chisels, 233 drills, 470 points, 11 wedges, 3 hammers, 2,833 picks, 10 crowbars, 26 cold cutters, 5 axes, 95 saws, 12 wrenches, 3 basin scoops, 85 wheelbarrows, 35 mattocks, 13 sets manhole lifters, 24 signs, and 99 miscellaneous tools. One thousand five hundred and sixty-eight manhole irons were made during the year for use on construction work. Forms were made for 11 construction and repair jobs.

Miscellaneous construction.—Tide gates were built and hung at the storm-water outlets of the James Creek Valley and Easby Point trunk sewers and also for the two special tide-gate chambers on the James Creek Valley trunk sewer. The tide-gate chamber at the outlet of the New Jersey Avenue and B Street trunk sewer was cleaned and seven new tide gates built and hung. Screen cages for the new Rock Creek pumping station were built.

SECTION D.—CONSTRUCTION, SEWERAGE SYSTEM.

The following is a statement of the length of sewers constructed during the year and the cost of same aggregated for the several construction districts:

Section.	Length.	Cost.
	<i>Feet</i>	
1. County west of Rock Creek.....	11,984.07	\$103,882.81
2. County east of Rock Creek.....	5,271.37	31,454.10
3. County west of Anacostia River.....	5,193.03	49,074.79
4. County east of Anacostia River.....	8,293.20	83,337.33
5. Washington City.....	11,526.67	97,616.82

The following is a detailed statement of sewers constructed in the various districts:

Western district, county west of Rock Creek.—In this area 7,224.87 linear feet of trunk sewers, and 4,759.20 linear feet of service sewers, a total of 11,984.07 linear feet were constructed as follows: Chevy Chase, 3,800.80 linear feet of service sewers; Cleveland Park, 1,461.50 linear feet of trunk sewers, and 320 linear feet of service sewers, a total of 1,781.50 linear feet; Woodley, 1,308.10 linear feet of trunk sewers, and 638.40 linear feet of service sewers, a total of 1,946.50 linear feet; Arizona, 2,525.50 linear feet of trunk sewers; Georgetown, 1,929.77 linear feet of trunk sewers. No storm-water receiving basins were constructed in this district during the year.

The following special work was done during the year: Contracts were let and work completed on the Kingle Road trunk sewer between Rock Creek and Connecticut Avenue, and the Reno Road trunk sewer between Macomb and Newark Streets. Work was completed on the construction of the Dalecarlia intercepting sewer, in tunnel, extending through the grounds of the Dalecarlia Reservation from Conduit Road to Falls Branch.

Central district, county east of Rock Creek.—In this area 635.80 linear feet of trunk sewers, 398 linear feet of service mains, and 4,217.57 linear feet of service sewers, a total of 5,271.37 linear feet, were constructed as follows: Takoma, 1,150 linear feet of service sewers; Petworth, 655.80 linear feet of trunk sewers, 398 linear feet of service mains, and 2,770.57 linear feet of service sewers, a total of 3,824.37 linear feet; Mount Pleasant, 130 linear feet of service sewers; Washington Heights, 167 linear feet of service sewers. Fifty-seven storm-water receiving basins were constructed in this district during the year.

The following special work was done during the year: Contract was let and work begun for the construction of the Piney Branch trunk sewer, extending from Georgia Avenue and Farragut Street to Eighth and Hamilton Streets NW.

Contract was let for the construction of the Luzon Avenue trunk sewer extending through the grounds of the Walter Reed Hospital between the line of Van Buren Street and the line of Butternut Street.

Eastern district, county west of Anacostia River.—In this area, between North Capitol Street and the Anacostia River, 1,986 linear feet of trunk sewers, and 3,207.03 linear feet of service sewers, a total of 5,193.03 linear feet, were constructed as follows: Eckington, 1,188.82 linear feet of service sewers; Brookland, 1,986 linear feet of trunk sewers, and 1,781.21 linear feet of service sewers, a total of 3,767.21 linear feet; Langdon, 237 linear feet of service sewers. Five storm-water receiving basins were constructed in this district during the year.

The following special work was done during the year: Work was completed on the construction of the East Brookland trunk sewer, extending from Eighteenth and Newton Streets to Fifteenth and Lawrence Streets NE.

Work was begun on the construction of a junction chamber at the present terminus of the Michigan Avenue trunk sewer near Eleventh Place and Randolph Street NE.

Eastern district, county east of Anacostia River.—In this area, east of the Anacostia River, 4,956.20 linear feet of trunk sewers, 519.00 linear feet of service mains, and 2,818 linear feet of service sewers, a total of 8,293.20 linear feet, were constructed as follows: Anacostia, 1,892.50 linear feet of trunk sewers, 44 linear feet of service mains, and 2,818 linear feet of service sewers, a total of 4,754.50 linear feet; Congress Heights, 475 linear feet of service mains; Benning, 3,063.70 linear feet of trunk sewers. No storm-water receiving basins were constructed in this district during the year.

The following special work was done during the year: Contract was completed on the construction of the Burnt Bridge Run trunk sewer extending from the Baltimore & Ohio Railroad to Minnesota Avenue SE. Work was resumed on the construction of the Stickfoot Branch trunk sewer between the Baltimore & Ohio Railroad and Nichols Avenue SE, also work was begun on the construction of the Good Hope Run trunk sewer extending from the Baltimore & Ohio Railroad to Eighteenth Street SE.

Contracts were completed on the construction of service sewers in Nineteenth Street SE, between Naylor Road and Minnesota Avenue; V Street SE, between the Baltimore & Ohio Railroad and Nichols Avenue; Shannon Place SE, between U and V Streets.

A special pile and platform foundation on the east shore of the Anacostia River, crossing Scaggs Branch in the line of the Anacostia main interceptor, was constructed by day labor.

Washington City district.—In this area, 894.90 linear feet of trunk sewers, 594 linear feet of service mains, and 11,526.67 linear feet of service sewers were constructed as follows: Northwest section, 126.90 linear feet of trunk sewers, 43 linear feet of service mains, and 2,725 linear feet of service sewers, a total of 2,894.90 linear feet; northeast section, 956.80 linear feet of service sewers; southeast section, 120 linear feet of service mains, and 5,327.17 linear feet of service sewers, a total of 5,447.17 linear feet; southwest section, 768 linear feet of trunk sewers, 431 linear feet of service mains, and 1,028.80 linear feet of service sewers, a total of 2,227.80 linear feet. Fifty-four storm-water receiving basins were constructed in this district during the year.

The following special work was done during the year: Contract was let and work completed for the construction of 768 linear feet of concrete invert in the Tiber Creek trunk sewer extending from Maryland Avenue to Second Street SW.

The James Creek Valley trunk sewer between N and P Streets SW, was completed by day labor. This construction will permit the abandonment of the old James Creek Canal between these limits.

The following tabulation shows the construction of the sewerage system, the average cost per mile, the funds appropriated for sewer construction, and the approximate population for each year for 20 years:

Year.	Population.	Expended for construc- tion. ¹	Miles constructed.	Average cost per mile.
1900	279,000	\$175,000.00	12.49	\$14,011.21
1901	284,000	250,000.00	13.25	18,867.92
1902	289,000	230,000.00	12.87	17,871.02
1903	294,000	170,000.00	16.42	10,353.23
1904	300,000	172,000.00	8.78	19,589.98
1905	305,000	168,650.00	11.99	14,065.89
1906	310,000	170,000.00	15.54	10,939.51
1907	315,000	333,000.00	17.09	19,485.08
1908	321,000	281,800.00	19.74	14,275.58
1909	326,000	295,500.00	18.01	14,408.66
1910	331,000	224,975.00	25.51	8,815.17
1911	341,000	219,040.00	23.18	9,449.53
1912	352,000	320,000.00	24.68	12,965.96
1913	353,000	320,000.00	23.52	13,605.44
1914	356,000	345,000.00	17.21	20,046.48
1915	359,000	382,500.00	20.54	18,622.20
1916	360,000	360,800.00	19.28	18,713.74
1917	362,000	425,000.00	14.89	28,542.71
1918	396,000	432,000.00	13.47	32,071.27
1919	450,000	282,000.00	7.06	39,947.39

¹ Excluding sewage disposal system.

SEWAGE DISPOSAL SYSTEM.

Anacostia main intercepting sewer.—The contract for the construction of sections Nos. 7, 8, and 9 of this interceptor was completed during the year by the construction of 3,063.70 linear feet of 4 feet 6 inches by 5 feet brick and concrete sewer. This construction completed the Anacostia main interceptor from Poplar Point as far northward as Seaggs Branch, with exception of the Philadelphia, Baltimore & Washington Railroad crossing.

Crossing Seaggs Branch and in the line of construction of the Anacostia main interceptor, 176.80 linear feet of timber and piling platform was constructed by day labor. This work was necessary in advance of the construction of section No. 10 of this interceptor.

Upper Potomac intercepting sewer.—The contract for the construction of section No. 1 of this interceptor was completed during the year by the construction of 312 linear feet of 48-inch cast-iron pipe sewer crossing under Rock Creek and of 160 linear feet of 4-foot brick and concrete sewer. Work was begun on the construction of section No. 2 of this interceptor and completed as far westward as Wisconsin Avenue.

Contract was let for the construction of the concrete substructure of the Rock Creek pumping station at the northwest corner of Twenty-seventh and K Streets NW.

Length of main sewers and pipe sewers and the number of storm-water receiving basins constructed during the fiscal year ending June 30, 1919.

Appropriations.	Main sewers.	Pipe sewers.	Storm- water receiving basins.
Main and pipe sewers.....	Linear feet.	Linear feet.	
Suburban sewers.....	1,488.90	5,539.74	46
Assessment and permit.....	8,421.30	2,431.51	42
Sewage-disposal system.....		14,100.10	
Miscellaneous trust-fund deposits.....	4,993.47		
Miscellaneous appropriations.....		4,558.93	16
		635.40	12
Total.....	14,903.67	27,265.68	116

SECTION E.—MAPS, RECORDS, AND DRAFTING.

Work was continued during the year on 10-feet=1-inch scale maps, showing all underground construction, vaults, building projections, curb, and street-railway tracks. Four such maps were completed during the year.

Drainage plats were prepared for 118 engineer department files and 104 plats prepared for construction of main and pipe sewers and receiving basins, also 23 plats showing assessment on account of connections from parcel property to public sewers.

Five new record maps of sewers have been made and one was replaced during the year. The work of posting current sewer construction on these maps was kept up to date as well as of new streets and alleys and much missing data of old work plotted from field surveys.

The counter tracings for use of the public for information have been kept posted to date with current construction as well as newly established or modified street grades. Three new sheets covering additional territory have been added during the year.

The 100-foot scale drainage study maps for the suburban portions of the District have been kept posted to date with current construction as well as with newly established or modified street grades and new subdivisions. In addition, nine old and badly worn maps have been replaced by new ones.

Eighty cards showing assessment pending for future sewers have been made, and 55 engineer department files, inclosing plats showing the construction of service sewers abutting assessable property have been forwarded through the chief clerk, engineer department, to the assessor. Three letters have been forwarded to the health officer with plats as notice of newly constructed service sewers abutting existing houses.

The card index of newly made subdivisions has been kept up to date, 199 having been added. In addition to this index record, these subdivisions are posted on record maps, record made, and plats made for the assessor upon subdivision of parcel property where same abuts service sewers in order that the proper special assessment may be levied.

One hundred and four new grade sheets for work constructed during the year have been filed and 14 old and badly worn sheets replaced.

Nineteen paving schedules of the surface division, covering 169 paving jobs, were examined, and where necessary, plats prepared for construction, reconstruction, or abandoning of sewers in advance of paving.

Forty surface division grade maps involving the establishment of new street grades or modification of existing approved grades have been studied with reference to the effect on the drainage system.

Plans, estimates, proposals, and specifications have been prepared for the construction of sewers under 10 contracts.

Four plats and deeds for rights-of-way have been prepared in connection with the extension of the public sewerage system, and all of same have been acquired and recorded. These are listed in Table 16, appended to this report.

Work has been continued on elimination of privies and a card index kept posted of every privy maintained in the District. Permits were issued by the health officer for the erection of 42 new privies.

SECTION F.—RECORDS AND ACCOUNTS.

The work of this division included the preparation of requisitions and vouchers, records of costs of construction, cost keeping, preparing pay rolls, and material and equipment accounting. During the year 650 construction jobs, 11,086 foremen's reports, 42,306 card records, 1,453 supply bills, 507 pay rolls, 1,003 requisitions, 277 transfer and refund vouchers, 346 engineer department files, 257 letters, and 29,098 miscellaneous reports were handled. The following financial statements of the various sewer appropriations and of expenditures from special funds gives a résumé of the operations for the year. The total of these expenditures was \$848,045.73.

SEWERAGE SYSTEM.

Cleaning and repairing sewers and basins:

Appropriation	-----	\$91,000.00
Expended—		

Mechanics, laborers, and watchmen	-----	\$54,832.92
Drivers and gate tenders	-----	16,070.45
Inspectors and other per diem employees	-----	6,226.33
Construction material and tools	-----	2,302.04
Repairs to equipment, equipment, and supplies	-----	4,344.41
Paid engineer department stables for forage, blacksmith work, etc.	-----	6,669.43
Paid purchasing office for salaries	-----	202.59
Paid surface division for repaving work	-----	225.86
Paid corporation counsel's office for salaries	-----	25.18
		<u>90,899.21</u>

Unexpended balance	-----	<u>100.79</u>
--------------------	-------	---------------

Maintenance and operation, sewage-pumping service:

Appropriation	-----	100,000.00
Expended—		

Mechanics, laborers, and watchmen	-----	\$50,671.54
Coal, oil, waste, and other supplies	-----	39,272.38
Tools and equipment renewals	-----	9,759.36
		<u>99,703.28</u>

Unexpended balance	-----	<u>296.72</u>
--------------------	-------	---------------

Main and pipe sewers and receiving basins:

Appropriation	\$107,000.00
Expended—	
Day-labor construction	\$40,218.85
Construction material and tools	16,448.39
Inspectors and other per diem employees	11,499.77
Paid surface division for repaving work	3,150.37
Paid purchasing office for salaries, etc.	1,117.00
Paid corporation counsel's office for salaries	25.18
Paid engineer department stables for overhead charges	203.70
	72,663.26
Unexpended balance ¹	34,336.74

Suburban sewers:

Appropriation	200,000.00
Expended—	
Day-labor construction	\$29,872.63
Construction material and tools	41,672.57
Inspectors and other per diem employees	12,427.05
Paid surface division for repaving work	293.63
Paid purchasing office for salaries, etc.	1,327.00
Paid chief clerk's office for salaries	184.00
Paid corporation counsel's office for salaries	25.18
Paid disbursing office for salaries	975.00
Paid Assistant Engineer Commissioner's office for salaries	250.00
Paid engineer department stables for overhead charges	203.70
Outstanding contracts and material to complete same	42,000.00
	129,230.76
Unexpended balance ¹	70,769.24

Assessment and permit work, sewers:

Appropriation	125,000.00
Expended—	
Day-labor construction	\$33,463.80
Construction material and tools	63,067.98
Inspectors and other per diem employees	8,667.74
Paid surface division for repaving work	1,223.74
Paid purchasing office for salaries, etc.	1,439.43
Paid chief clerk's office for salaries	184.00
Paid Assistant Engineer Commissioner's office for salaries	250.00
Paid corporation counsel's office for salaries	25.18
Paid engineer department stables for overhead charges	203.70
	108,525.57

Unexpended balance¹ 16,474.43

Miscellaneous trust-fund deposits. District of Columbia :

Amount received from various depositors, fiscal year 1919 56,797.87

Expended—

Day-labor construction	\$20,811.03
Construction material and tools	10,334.05
Paid surface division for repaving work	1,347.43
Contingent charges for engineering, supervision, wear of tools, etc.	3,135.40

35,627.91

¹ The reason for this large unexpended balance was the failure to reappropriate same in the bill for the fiscal year 1920. In their annual estimates for 1920 the commissioners asked for this reappropriation, and in the bill of the Sixty-fifth Congress, fourth session this item was included. But when the bill failed of passage in that session and went over to the Sixty-sixth Congress, through misunderstanding, the item for reappropriating these funds was omitted from the bill.

Miscellaneous trust-fund deposits, District of Columbia—Contd.

Inspection and engineering, cleaning, and repairing—	
Cleaning garage traps-----	\$689.16
Inspection of vaults-----	60.00
Inspection of tunnels and conduits-----	105.00
Inspection of private pipe lines-----	16.00
Engineering and inspection of steam lines-----	172.00

Returned to depositors-----	\$1,042.16
Carried over to 1920-----	18,527.80

Total-----	1,600.00

Construction from miscellaneous appropriations:	56,797.87
Repayments -----	15,849.51

Expended—

Construction—

Day-labor construction-----	\$6,646.66
Construction material-----	4,413.98
Paid surface division for repaving work-----	43.10
Contingent charges for supervision, engineering, wear of tools, etc-----	957.59

	12,061.33

Inspection, cleaning, repairing and other work—

Inspection and repairs to trunk sewer connections from houses-----	80.00
Inspection and repairs to connections from fire hydrants-----	35.00
Special large-size connections-----	270.00
Adjusting basins and manholes in connection with surface division work-----	683.53
Cleaning Bureau of Engraving and Printing ink basins-----	1,652.21
Erection and removal of rope barricades from Peace Monument to Seventeenth Street NW., in connection with maintenance of public order (welcome home parade)-----	623.78
Pumping storm water from flooded buildings, and underground tunnels-----	101.76
Rental of sewer department Marine Railway for dry-docking vessels to various depositors-----	342.00

	3,788.28

Total -----

15,849.61

Purchase and condemnation of land for rights of way for sewers:

Appropriation -----	2,000.00
Expended -----	
Cost of rights of way, titles, and recorder fees-----	41.30

Unexpended balance-----

1,958.70

Summary of expenditures, sewerage system.

Cleaning and repairing, 1919-----	\$90,899.21
Sewage pumping service, 1919-----	99,703.28
Main and pipe sewers, 1918-----	41,071.60
Main and pipe sewers, 1919-----	72,663.26
Suburban sewers, 1917-----	44,117.17
Suburban sewers, 1918-----	97,159.78

Suburban sewers, 1919	\$87, 230. 76
Assessment and permit work, 1918	6, 592. 48
Assessment and permit work, 1919	108, 525. 57
Permit work, 1919	105. 00
Miscellaneous trust-fund deposits, 1919	36, 670. 07
Miscellaneous appropriations, 1919	15, 849. 61
Condemnation, 1919	41. 30
Outstanding contracts:	
Suburban sewers, 1917	11, 700. 00
Suburban sewers, 1919	42, 000. 00
Total	754, 329. 09

The following are payments into the Treasury on account of assessment and service sewers under the appropriations indicated below during the fiscal year 1919:

Assessment and permit work sewers	\$42, 902. 99
-----------------------------------	---------------

SEWAGE-DISPOSAL SYSTEM.

Upper Potomac interceptor:

Appropriation	\$40, 000. 00
Expended—	
Day-labor construction	\$427. 74
Construction material	14, 314. 26
Outstanding contracts and materials to complete same	25, 200. 00
	39, 942. 00
Unexpended balance	58. 00

Sewage treatment works:

Appropriation	60, 000. 00
Purchase of land, recorder's fees, etc.	20, 360. 60
Unexpended balance ¹	39, 639. 40

Summary of expenditures, sewage disposal system.

Anacostia main interceptor, 1916	\$585. 63
Anacostia main interceptor, 1917	32, 414. 17
Upper Potomac interceptor, 1917	25, 024. 06
Upper Potomac interceptor, 1918	54, 190. 18
Upper Potomac interceptor, 1919	14, 742. 00
Outstanding contracts:	
Upper Potomac interceptor, 1918	23, 000. 00
Upper Potomac interceptor, 1919	23, 700. 00
	173, 656. 04

TOTAL EXPENDITURES.

Sewerage system	\$700, 687. 79
Sewage-disposal system	126, 956. 04
Purchase and condemnation of land for rights of way	41. 30
Purchase of land for sewage treatment works	20, 360. 60
Total expenditures during fiscal year 1919	848, 045. 73

¹ Condemnation proceedings not completed.

ALLOTMENTS.

Statement of expenditures under allotments made to other departments from sewer appropriations, fiscal year 1919.

Appropriations.	Engineer stables.	Purchasing officer, salaries of inspectors and labor- ers at property yard.	Chief clerk, engineer depart- ment.	Disburs- ing office.	Corpo- ration counsel's office.	Assist- ant to Engineer Commis- sioner's office.	Total.
Total allotments.....	\$1,018.50	\$4,086.02	\$368.00	\$975.00	\$100.72	\$500.00	\$7,048.24
Expended:							
Cleaning and repairing.....	407.40	202.59	-----	-----	25.18	-----	-----
Main and pipe.....	203.70	907.28	-----	-----	25.18	-----	-----
Suburban sewers.....	203.70	1,327.50	184.00	975.00	25.18	250.00	-----
Assessment and permit work	203.70	1,398.14	184.00	-----	25.18	250.00	-----
Total expenditures.....	1,018.50	3,835.51	368.00	975.00	100.72	500.00	6,797.73

Statement of expenditures under allotments from outside departments to sewer department during the fiscal year 1919.

Contingent expenses:

Total allotment.....	\$1,200.00
Expenditures, stationery, printing, and supplies.....	1,175.89

Unexpended balance..... 24.11

Statement of expenditures for per diem employees, fiscal year 1919.

Cleaning and repairing.....	\$3,841.42
Main and pipe.....	7,156.39
Suburban sewers.....	7,749.21
Assessment and permit work.....	2,727.64
Anacostia main interceptor.....	715.00
Upper Potomac interceptor.....	292.00
Total.....	22,481.66

The following is a statement of the unexpended balances of the three principal construction appropriations for 1901 to 1919, inclusive:

Fiscal year.	Main and pipe sewers.	Suburban sewers.	Assessment and permit sewers.	Total.
1901.....	\$1,656.53	\$2,237.61	-----	\$3,894.14
1902.....	2,610.75	6,745.80	-----	9,356.55
1903.....	3,948.39	5,762.88	-----	9,711.27
1904.....	268.70	2,072.54	-----	2,341.24
1905.....	5,676.05	6,926.46	-----	12,602.51
1906.....	7,177.09	4,798.30	-----	11,975.39
1907.....	255.68	11,038.27	-----	11,293.95
1908.....	3,878.93	815.05	-----	4,693.98
1909.....	678.12	570.80	-----	1,248.92
1910.....	622.34	4,483.94	-----	5,109.28
1911.....	489.36	401.36	-----	890.72
1912.....	3,716.32	791.12	-----	4,507.44
1913.....	119.82	13.36	\$118.16	251.34
1914.....	83.43	1,316.55	134.65	1,534.63
1915.....	37.00	441.18	3,785.50	4,263.68
1916.....	17.65	20.00	3,673.75	3,711.40
1917.....	127.73	302.42	1.38	431.53
1918.....	75.88	3,798.94	4,411.66	8,286.48
1919.....	34,336.74	70,769.24	16,474.43	121,580.41
Total.....	65,776.51	123,308.82	28,599.53	217,684.86

¹ The reason for this large unexpended balance was the failure to reappropriate same in the bill for the fiscal year 1920. In their annual estimates for 1920 the Commissioners asked for this reappropriation, and in the bill of the Sixty-fifth Congress, fourth session, this item was included. But when the bill failed of passage in that session and went over to the Sixty-sixth Congress, through misunderstanding, the item for reappropriating these funds was omitted from the bill.

Statement of expenditures for supervision, inspection, and record on account of underground construction, public-service corporations, and the amounts charged to each of the several corporations for the fiscal year 1919.

Expenditures:	
Supervision	\$959.25
Inspection	1,318.58
Record	456.00
Total	2,733.83

Charged as follows:

Potomac Electric Power Co.	971.89
Chesapeake & Potomac Telephone Co.	1,096.09
Washington Gas Light Co.	508.27
Georgetown Gas Light Co.	75.14
Washington Railway & Electric Co.	1.00
Capital Traction Co.	14.29
Western Union Telegraph Co.	67.15
Total	2,733.83

SECTION G.—PUBLIC-SERVICE CORPORATION CONSTRUCTION.

This special work assigned to the division of sanitary engineering involves detailed determination of locations for new extensions of gas mains, electric, telephone, and telegraph conduits and their accessories, as well as methodic supervision of the work done under permits therefor and the accurate location of all work. Applications for these new constructions require careful location studies to avoid interference with existing and future construction, and particularly to assure economical and orderly occupation of the public space along predetermined systematic lines. During construction the work is regularly inspected, compliance with the terms of the permit are insisted upon, and an accurate record of the location of all work is obtained from field measurements. Record sheets are prepared showing the work in detail, and the work is then plotted on record maps and recorded on card system.

The work for the year may be summarized as follows:

Permits prepared upon application	1,176
New record cards made	1,176
New jobs inspected and recorded on sheet	1,004
Inspections of work under construction	2,794
Daily average jobs under construction	26
New gas mains laid	miles 4.54
Electric duct laid	do 64.90
Manholes constructed	596
Drains from manholes and railway tracks	37
Houses connected with gas mains	612
Houses connected for electric light and power	776

UNITED STATES GOVERNMENT WORK.

Steam lines, electric conduits, and tunnel were constructed as follows:

Steam lines.—From Potomac Electric Power Co. power house at Fourteenth and B Streets NW., to new Army and Navy buildings on south side of B Street, between Seventeenth and Twenty-first Streets NW., 4,221 feet of 12-inch steam main and 4-inch return pipe were laid.

From Potomac Electric Power Co. power house at Fourteenth and B Streets NW., to temporary buildings in Smithsonian Grounds and Armory Square south of B Street and east of Ninth Street NW., 4,620 feet of 6 to 14 inch steam main was laid.

From new power house on the southeast corner of New Jersey Avenue and D Street NW., to dormitories between Union Station and the United States Capitol, 2,589 feet of 5 to 10 inch steam main and 2,539 feet of 3 to 6 inch return pipe were laid.

Conduits.—In alley of square No. 296 connecting the Agriculture Department building 114 feet of 2-duct electric conduit was laid.

From United States Senate Office Building to dormitories between Union Station and United States Capitol 541 feet of 4-duct and 1,120 feet of 1-duct were laid.

Tunnel.—Two hundred and sixty feet of 10 by 10 foot tunnel crossing Pennsylvania Avenue, west of Fifteenth Street NW., and connecting United States Treasury building with Treasury Annex on the northeast corner of Pennsylvania Avenue and Madison Place was constructed.

PRIVATE PIPE LINES.

Permits prepared for gasoline and compressed-air pipes-----	25
Inspected, located, and plotted-----	14

PRIVATE VAULTS IN PUBLIC SPACE.

Applications approved-----	12
Vaults inspected, located, and recorded-----	23

WATER DEPARTMENT CONNECTIONS TO THE SEWERAGE SYSTEM.

There were 66 permits issued the water department for drains from fire hydrants, blow-offs, air valves, and watering troughs, and 74 were inspected and recorded. Certification of noninterference with existing underground construction of record was made in connection with nine conduits constructed by the electrical department, and three letters were written the public-service corporations at request of the surface division. In addition to the current work of the year, much data was collected as to the location of previously unrecorded vaults, mains, and conduits, but a large amount still remains to be done.

TABLES.

Table No.

	Page.
1. Sewerage system, contract construction-----	104
2. Sewage-disposal system, contract construction-----	104
3. Permit system, sewers constructed-----	104
4. Assessment system, sewers constructed-----	105
5. Main and pipe catch basins constructed-----	105
6. Main and pipe sewers constructed-----	106
7. Suburban sewers constructed-----	106
8. Whole-cost sewers constructed-----	107
9. Sewers constructed from miscellaneous appropriations-----	109
10. Inspectors and other per diem employees and the appropriation from which paid-----	110
11. Average cost of pipe sewers and basins, fiscal year 1919-----	110
12. Average cost of pipe sewers for 15 years-----	110
13. Cost of sewer pipe, cement, sand, and gravel for 15 years-----	111
14. Maintenance work, sewerage system, for 10 years-----	111
15. Summary of sewerage system for 25 years-----	112
16. Rights of way acquired for sewer extension, fiscal year 1919-----	112
17. Electric conduits laid, fiscal year 1919-----	112
18. Electric conduits, total lengths, by sizes, to July 1, 1919-----	113
19. Electric conduits, lengths laid each year to July 1, 1919-----	114
20. Gas mains, lengths laid, by sizes, fiscal year 1919-----	115
21. Gas mains, lengths laid, by sizes, 1907 to 1919-----	115
22. Gas mains, lengths laid each year, 1907 to 1919-----	116

TABLE No. 1.—*Sewerage system contract construction, fiscal year 1919.*

Contract No.	Constructed.		Total cost.	Appropriation.	Contractor.
	Length.	Size.			
<i>Feet.</i>					
6199	1,230.00	3-foot 6-inch by 5-foot.....	\$4,217.18	Suburban, 1917....	W. F. Brenizer Co.
6202	546.70	6-foot 6-inch by 6-foot.....	13,695.41	.....do.....	L. M. Johnston.
6265	{ 295.80	.....do.....	{ 5,008.34	.....do.....	W. F. Brenizer Co.
6266				.....do.....	Do.
6291	3,606.00	3-foot by 5-foot.....	10,517.37	.....do.....	W. H. H. Allen Co.
			13,689.19	.....do.....	
			49,678.94	Suburban, 1918....	
6294G	{ 271.00	24-inch.....	5,426.07	Assessment and permit, 1918.	Wm. F. Cush.
	408.00	18-inch.....			
	171.00	12-inch.....			
6296	928.00	8-foot.....	8,088.00	Suburban, 1918....	W. F. Brenizer Co.
6509	{ 1,642.93	4-foot 6-inch.....	{ 43,080.32	.....do.....	George Hyman.
	649.07	4-foot.....		.....do.....	Do.
6510	865.00	4-foot 6-inch.....	12,034.26	.....do.....	Louis Aiello.
6514	564.00	2 by 3 foot.....	4,963.95	.....do.....	W. F. Brenizer Co.
6516	768.00	30-foot wide invert.....	17,239.38	Main and pipe, 1918.	Wm. F. Cush.
6705			(2)	Suburban, 1919....	
	11,945.50		187,638.50		

¹ Work not completed.² Work to be done in 1920.TABLE No. 2.—*Sewage-disposal system contract construction, fiscal year 1919.*

Contract No.	Section.	Total cost.	Appropriation.		Contractor.
			To District of Columbia.	To depositor.	
6206	Anacostia main interceptor, sections Nos. 7, 8, 9, and 10.	\$32,673.05	Anacostia main interceptor, 1917.		W. F. Brenizer Co.
6281	Upper Potomac interceptor, section No. 2.	{ 20,268.56 { 17,360.21	{ Upper Potomac interceptor, 1917. { Upper Potomac interceptor, 1918.	.....do.....	Do.
6517	Upper Potomac interceptor, section No. 1.	46,880.69	.....do.....	.....do.....	Do.
6518	Upper Potomac interceptor, section No. 3.	(2)	.....do.....	.....do.....	Do.
		107,182.51			

¹ Work not completed.² Work not started.TABLE No. 3.—*Sewer construction under permit system from the appropriation for assessment and permit work for the fiscal year 1919.*

Order No.	Location.	Length.	Size.	Amount of de-posit.	Cost.		Total cost.	Amount re-turned.	For whom done.
					To Dis-trict of Co-lumbia.	To de-po-sitor.			
1	Alley of square No. 2551.....	Feet. 35	Inches. 12	\$105	\$105	\$105	\$210	.....	Harry F. Boryer.

TABLE No. 4.—*Sewer construction under the assessment system from the appropriation for assessment and permit work for the fiscal year 1919.*

Order No.	Length.	Size.	Total cost.	Order No.	Length.	Size.	Total cost.
		<i>Feet.</i>	<i>Inches.</i>			<i>Feet.</i>	<i>Inches.</i>
100.....	389.00	12	\$890.69	132.....	338.00	10	\$1,215.87
101.....	500.00	12	1,312.32	133.....	195.00	10	524.13
102.....	485.83	12	2,017.91	134.....	107.60	10	458.43
103.....	355.20	12	1,044.47	135.....	183.70	10	501.33
104.....	350.00	10	852.57	136.....	439.00	10	1,343.82
105.....			(1)	137.....	50.00	10	254.07
106.....	231.00	10	651.35	138.....	192.00	10	528.85
107.....	539.80	10	1,649.47	139.....	106.00	10	417.78
108.....	15.00	10	34.96	140.....	82.56	10	403.60
109.....	320.00	10	938.48	141.....	214.00	12	723.74
110.....	203.36	15	574.91	142.....	289.50	10	953.70
111.....	266.25	12	631.49	143.....	186.60	12	2 635.83
112.....	141.00	10	469.95	144.....	173.60	10	469.88
113.....	147.00	10	335.20	145.....	505.49	10	1,156.44
114.....	140.30	12	357.18	146.....	227.00	10	685.32
115.....	687.00	12	1,767.36	147.....	120.00	12	2 531.30
116.....	95.00	12	313.85	148.....	80.60	10	326.34
117.....	270.00	12	999.65	149.....	307.31	10	947.08
118.....	{ 206.39	24 } 283.00	3,170.60	150.....	183.40	10	424.10
	21			151.....	192.00	10	701.96
119.....	132.00	10	361.37	152.....	132.00	10	583.34
120.....	120.00	10	346.01	153.....	100.00	10	431.14
121.....	162.40	21	1,025.12	154.....	65.00	10	248.77
122.....	57.00	10	286.05	155.....	247.00	12	818.25
123.....	40.00	10	165.29	156.....	194.60	21	1,219.91
124.....	{ 38.00	18 }	900.85	157.....	143.15	10	526.30
	204.50	12		158.....	320.50	10	812.06
125.....	410.10	24	2,836.76	159.....	45.00	12	2 253.60
126.....	100.02	10	273.71	160.....	138.00	10	615.56
127.....	{ 126.40	12 }	1,183.82	161.....	108.00	12	432.13
128.....	213.60	10		162.....	99.00	10	307.32
129.....	200.00	12	608.30	163.....	103.72	12	280.13
130.....	205.00	10	558.03				
131.....	200.00	12	812.30	Total.....	14,021.30		48,286.65
131.....	285.00	10	1,173.64				

¹ To be done in 1920.² Repaving not reported.TABLE No. 5.—*Basin construction from the appropriation for main and pipe sewers, fiscal year 1919.*

Order.	Basins.	Total cost.	Order.	Basins.	Total cost.
500.....	2	\$304.83	521.....		
501.....	8	1,741.69	527.....		
502.....	6	1,121.28	532.....		
503.....	2	232.15	534.....		
510.....	1	148.69	538.....		
516.....	3	344.10	540.....		
517.....	3	346.55	546.....		
518.....	1	154.32	Total.....	38	6,419.79
519.....	3	425.15			

TABLE No. 6.—*Sewer constructed from the appropriation for main and pipe sewers, fiscal year 1919.*

Order No.	Length.	Size.	Total cost.	Order No.	Length.	Size.	Total cost.
	Feet.	Inches.			Feet.	Inches.	
503.			(1)	528.	33.00	12	\$167.60
504.			(1)	529.	21.00	24	3 431.63
506.	{ 174.66	24	\$2,070.22	530.	(2)		171.35
	116.84	18		531.	(2)		152.15
507.	126.90	24	1,257.13	533.			(4)
508.	66.70	24	1,190.45		463.00	15	
509.	115.00	15	1,315.12		15.00	12	2,456.80
511.	250.00	21	1,804.52	535.	{ 1,080.00	72 by 72	
512.	54.50	18	380.70	536.	93.00	84 by 84	22,943.52
513.	75.00	12	188.89	539.	(3)		104.95
514.	310.80	12	1,247.25	541.	(2)		91.85
515.	120.00	12	478.13	542.	66.00	24	533.05
520.	157.00	24	854.23	543.	30.00	72 by 72	1,051.85
522.	18.00	15	146.02	544.	54.00	24	566.31
523.	270.30	12	878.63	545.	12.74	18	70.23
524.	590.40	24	5,418.25		Total.	5,011.04	
525.	234.00	12	1,078.06				49,162.83
526.	463.00	12	2,103.96				

¹ Canceled.² 1 manhole.³ Repaving not reported.⁴ To be done in 1920.TABLE No. 7.—*Sewer construction from the appropriation for suburban sewers, fiscal year 1919.*

Order No.	Length, etc.	Size.	Total cost.	Order No.	Length, etc.	Size.	Total cost.
		Inches.				Inches.	
800	2 catch basins		\$357.48	820	1 catch basin		\$130.67
801	Apron and side wall		510.93	821	4 catch basins		696.20
802	{ 57 feet	15	268.63	822	2 catch basins		410.75
	{ 30 feet	10		823	do		278.26
803	4 catch basins		608.04	824	1 catch basin		471.92
804	1,308.10 feet	18	4,671.74	825	1 catch basin, 1 manhole		233.21
805	Junction chamber		1,632.70	826	2 catch basins		305.47
806	2 catch basins		288.39	827	do		311.95
807	4 catch basins		604.85	828	do		300.86
808	1 manhole		97.05	829	1 manhole		102.65
809	2 manholes		195.50	830	2 catch basins		449.63
810	9 feet	15	150.57	831	1 catch basin		185.94
811	433.80 feet	24 by 36	4,672.09	832	do		137.86
812	344.40 feet	12	1,503.74	833	do		171.95
813	{ 335 feet	12	1,870.39	834	do		146.16
	{ 93 feet	15		835	3 catch basins		464.92
814	1 catch basin		181.46	836	231 feet		1,031.66
815			(2)	837	1 catch basin		99.53
816	32.50 feet		54	838	Junction chamber		477.86
817	Resurface trench		874.98	839	Connection to culvert		33.61
818	1 catch basin		217.69				
819	do		187.15		2,873.80 feet		26,130.65

¹ Repaving not reported.² Work canceled.

TABLE No. 8.—*Never construction under the whole cost system from miscellaneous trust fund deposits for fiscal year 1912.*

Order No.	Location	Length, Feet.	Diameter, Inches.	Size,	Remarks.	Amount of deposit.	Cost of work.	Average refunded.	For which trustee.
1000	East side Thirteenth Street NW., between G and H Streets.	121.00	12	2 manholes.....	\$750.00	\$715.25	\$31.75	Chesapeake & Potomac Telephone Co.	
1001	Fourteenth Street NW., between B and C Streets.	135.00	12	Flume in sewer.....	50.00	7.30	12.70	Lake Stone Co.	
1002	Twenty-eighth and Calvert Streets NW.....	700.00	15	1 catch basin.....	80.00	657.15	112.55	J. Howell & Son.	
1003	East side Potomac Avenue SE., between Seventeenth and Nineteenth Streets.	700.00	15	2 manholes.....	4,000.00	2,981.06	1,015.91	U. S. Housing Corporation.	
1004	West side Eleventh Street NW., between Clifton and Euclid Streets.	10.00	12	.....	50.00	44.40	5.40	Nora A. Ryder.
1005	Intersection Twenty-ninth and Calvert Streets NW.	124.00	12	3 catch basins.....	600.00	120.85	179.15	D. J. Howell & Son.	
1006	Union Station Plaza (dormitory project No. 51), East boundary, Massachusetts Avenue Heights	272.00	15	3 manholes.....	800.00	346.91	453.09	U. S. Housing Corporation.	
1007	Subdivision between Garfield Street and Cathedral Avenue, between C and New Streets.	271.20	12	.....	2,300.00	1,745.75	151.24	D. J. Howell & Son. ,
1008	Eighteenth street SE., between C and New Streets.	359.85	12	.....	(1)	1,507.78	.....	U. S. Housing Corporation.
1009	C Street SE., between Eighteenth and Nineteenth Streets.	115.15	15	1 manhole.....	(1)	554.73	.....	Do.
1010	Seventeenth Street SE., between A and B Streets.	378.00	12	2 manholes.....	(1)	1,472.21	.....	Do.
1011	New Street SE., between Eighteenth and Nineteenth Streets.	470.30	15	.....	(1)	2,120.14	.....	Do.
1012	Eighteenth street SE., between New and B Streets.	350.00	12	1 manhole.....	(1)	1,376.38	.....	Do.
1013	Nineteenth Street NE., between East Capitol and B Streets.	458.40	21	3 manholes.....	(1)	5,672.44	.....	Do.
1014	New Jersey Avenue NW., between B and C Streets, East Capitol Street SE., between Seventeenth and Eighteenth Streets.	390.80	24	1 manhole.....	100.00	80.41	19.59	Do.	
1015	.....do.....	475.70	15	.....do.....	(1)	1,978.01	.....	Do.
1016	Alley of square 288.	102.50	10	.....do.....	600.00	399.13	.57	Chesapeake & Potomac Telephone Co.
1017	(2)	.....	.....	.....	.....	.....	.....	.....
1018	Capitol and D Streets.	.....	.....	1 manhole.....	100.00	99.82	18	U. S. Housing Corporation.
1019	North Capitol and D Streets.	.....	.....	200 yards excess	250.00	288.45	40.55	Charles L. Tankeley.
1020	Thirteenth Street NW., between Spring Road and Quincy Street.	.....	.....	1 manhole, excavation.	(1)	1,738.54	.....	U. S. Housing Corporation.
1021	East Capitol Street SE., between Eighteenth and Nineteenth Streets.	415.00	15	1 manhole.....	350.00	331.07	15.93	W. G. Cornell Co.	
1022	Intersection Twenty-third and Water Streets NW.	367.17	15	2 manholes.....	(1)	1,705.52	.....	U. S. Housing Corporation.
1023	Nineteenth Street SE., between East Capitol and A Streets.	328.30	12	1 manhole.....	(1)	1,549.46	.....	Do.
1024	A Street SE., between Eighteenth and Nineteenth Streets.	.....	.....	.....	.....	.....	.....	.....

¹ Whole cost deposit made of \$24,210 by the United States Housing Corporation for cost of work; jobs 1008, 1009, 1010, 1011, 1012, 1013, 1015, 1021; total cost of work

² Cancelled.

TABLE No. 8.—*Scicor construction under the whole cost system from miscellaneous trust fund deposits, etc.—Continued.*

Order No.	Location.	Length.	Size.	Remarks.	Amount of deposit.	Cost of work.	Amount returned.	For whom done.
1025	Ninth Street SW, between D and E Streets	212.06	Inches.	18 2 manholes.....	1,575.00	1,575.00	.....	Pennsylvania Railroad Co.
1026	I Street SE, west of Hall Street.....	33.00	.....	1 manhole.....	150.00	139.78	10.22	International Conveyor Co.
1027	Seventeenth Street NW, between I Pennsylvania and H Street.....	33.00	.....	1 manhole.....	425.00	344.53	80.47	U. S. Housing Corporation.
1028	T Street NE, between Third and Fourth Streets	381.00	.....	1 manhole.....	100.00	82.70	17.30	Washington Railway & Electric Co.
1029	Water Street SW, between Thirteenth-and-a-half and Fourteenth Streets.....	.....	.....	.....	1,500.00	986.06	513.94	I. D. Snoot, construction, Q. M. C., U. S. A.
1030	Van Ness Street NW, between Connecticut and Idaho Avenues.....	.....	.....	1 manhole.....	150.00	113.90	36.10	Solan Bros.
1031	Bolling Field.....	344.00	12	.....	3,000.00	2,579.51	420.49	Department Military Aeronautics.
		{ 36.00	15	.....	.....	.....	.....
		{ 312.00	8	.....	.....	.....	.....
		{ 475.00	8	2 manholes.....	1,200.00	682.79	517.21	Do.
				Rope barricade.....	750.00	719.45	30.55	R. N. Harper.
1032	do Pennsylvania Avenue, between First and Jackson Streets NW.....	.....	.....	.....	.....	.....	.....
1033	.....	.....	8	.....	.....	.....	.....
1034	I Street SE, between South Capitol and Half Streets.....	20.00	12	1 manhole.....	75.00	74.25	.75	International Conveyor Co.
1035	Kalorama Road NW, between Seventeenth Street and Ontario Road.....	10.00	8	.....	40.00	38.78	1.22	E. R. Keene.
		7,730.43	.....	.....	19,615.00	35,297.12	4,033.09	

TABLE No. 9.—*Sewer construction and other work from miscellaneous appropriations, fiscal year 1919.*

Order No.	Location.	Work done.	Total Cost.	Appropriation.
1100	Mason Place NW., between Pennsylvania Avenue and H Street.	273 feet of 2 by 3 foot; 1 manhole.	\$2,842.37	National security and defense.
1101	K street NW., between Twenty-fourth and Twenty-eighth Streets.	3 catch basins.....	500.43	Improvements and repairs, District of Columbia, 1918, repairs to streets.
1102	South side Pennsylvania Avenue NW., between Rock Creek and Twenty-sixth Street.	13 feet of 12-inch; 1 manhole.	273.71	Improvements and repairs, District of Columbia, 1917.
1103	Nineteenth Street NW., between E and G Streets.	(1)		
1104	Nineteenth Street and Virginia Avenue NW.	1 catch basin.....	124.55	Improvements and repairs, District of Columbia, 1918, north-west schedule.
1105	Northeast corner Seventeenth and Irving Streets NW.	.....do.....	150.91	Improvements and repairs, District of Columbia, 1918, repairs to suburban roads.
1106	Eighteenth and D Streets NW.	Adjusted 2 catch basins.	64.69	Improvements and repairs, District of Columbia, 1919.
1107	Square 739.....	2 catch basins.....	317.62	Streets, District of Columbia, 1919, disposal city refuse (garbage).
1108	Fourth and E Streets, NW.....	1 catch basin.....	122.79	Improvements and repairs, District of Columbia, 1919, repairs to streets.
1109	East side Seventh Street, between B north and B south.	.....do.....	193.08	Temporary buildings in Henry Park.
1110	Water Street SW., between Thirteen-and-a-half and Fourteenth Streets.	(1)		
1111	Eighteenth and B, Nineteenth and B, Twentieth and B Streets NW.	3 catch basins.....	599.44	Improvements and repairs, District of Columbia, 1919, approaches, etc., U. S. B.
1112	Twenty-first Street and New York Avenue NW.	1 catch basin.....	153.25	Do.
1113	Fourteenth and C Streets NW.	.....do.....	144.64	Sidewalk and curbs, District of Columbia, 1919.
1114	T Street NE., between Third and Fourth Streets.	(1)		
1115	Second and N Streets SE.....	1 manhole.....	262.92	Repairs and preservation, 1918, United States Navy Yard; Bureau of Yards and Docks.
1116	Bolling Field.....	(1)		
1117	.....do.....	(1)		
1118	Alley, square 3027.....	87 feet of 6-inch....	111.80	Improvements and repairs, District of Columbia, 1919, repairs to streets.
1119	Northeast corner Holmead and Park Road; Park Road west of Holmead Place NW.	2 catch basins.....	276.38	Construction suburban roads and suburban streets, District of Columbia, 1917.
1120	Northwest northeast corners Eleventh and Park Road; Northeast corner Thirteenth and Park Road NW.	2 catch basins.....	313.17	Construction suburban roads and suburban streets, District of Columbia, 1917.
1121	Southeast corner Twenty-third Street and Virginia Avenue NW.	1 catch basin.....	118.01	Improvements and repairs, District of Columbia, 1919, repairs to streets.
1122	Northeast, southeast corners Twenty-third and I Streets NW.	2 catch basins.....	323.41	Do.
1123	South side Water Street SW., front Fish Market.	4 gutter drops; 207 feet of 8-inch.	606.68	Building fish market, District of Columbia.
1124	Seventeenth and Kalorama and Ontario and Kalorama Roads NW.	4 catch basins.....	521.49	Construction suburban roads and suburban streets, District of Columbia, 1919.
1125	Crossing Seaggs Branch, between east shore Anacostia River and Bennings Road.	176.8 feet of platform, 8 feet 6 inches.	2,078.34	Anacostia main interceptor, 1916.
1126	Northeast corner Fifth and Shepherd, northeast corner Illinois Avenue and Shepherd Street NW.	2 platforms, 8 feet 6 inches.	239.71	Construction suburban roads and suburban streets, District of Columbia, 1919.
1127	Northwest corner Sixth Street and Rhode Island Avenue NE.	1 platform, 8 feet 6 inches.	163.19	Do.

¹ Work canceled.

TABLE No. 9.—*Sewer construction and other work from miscellaneous appropriations, fiscal year 1919—Continued.*

Order No.	Location.	Work done.	Total Cost.	Appropriation.
1128	Fourteenth and D Streets SW..	Unloading cement.	\$70.56	Sewers, District of Columbia, 1919, assessment and permit work (purchasing office allotment, per diem salaries, and maintenance of District of Columbia property yard).
	Total.....		10,633.14	

TABLE No. 10.—*Inspectors and other employees of the sewer division, temporarily employed, and the appropriations from which paid, fiscal year 1919.*

Appropriations.	Inspectors.	Overseers.	Other employees.	Total.
Construction, sewerage system:				
Main and pipe sewers.....	\$784.56	\$1,888.20	\$8,827.01	\$11,499.77
Suburban sewers.....	1,640.85	1,185.50	9,000.70	12,427.05
Assessment and permit work.....	162.50	151.90	8,353.34	8,667.74
Construction, sewage-disposal system:				
Upper Potomac interceptor.....	292.00			292.00
Anacostia main interceptor.....		715.00		715.00
Sewage pumping service.....		338.27	912.62	1,250.89
Maintenance: Cleaning and repairing.....	666.28	1,800.00	3,700.05	6,226.33
Total.....	3,546.19	6,138.87	31,393.72	41,078.78

TABLE No. 11.—*Average cost of constructing pipe sewers and storm-water receiving basins for fiscal year 1919.*

Size of sewer.	Unit cost per foot.		Total cost per foot.
	Labor.	Material.	
8-inch diameter.....	\$0.80	\$0.00	\$1.10
10-inch diameter.....	1.68	.84	2.52
12-inch diameter.....	1.91	1.01	2.92
15-inch diameter.....	1.92	1.29	3.21
18-inch diameter.....	2.38	1.54	3.92
21-inch diameter.....	2.59	2.71	5.30
24-inch diameter.....	3.62	3.36	6.98

TABLE No. 12.—*Average cost of constructing pipe sewers for 15 years.*

Year.	8-inch diameter.		10-inch diameter.		12-inch diameter.		15-inch diameter.		18-inch diameter.		21-inch diameter.		24-inch diameter.	
	La- bor.	Ma- te- ri- al.	La- bor.	Ma- te- ri- al.	La- bor.	Ma- te- ri- al.	La- bor.	Ma- te- ri- al.	La- bor.	Ma- te- ri- al.	La- bor.	Ma- te- ri- al.	La- bor.	Ma- te- ri- al.
1905.....	\$0.98	\$0.38	\$0.96	\$0.55	\$1.19	\$0.60	\$1.41	\$0.77	\$1.45	\$0.89	\$1.92	\$1.01	\$1.87	\$1.43
1906.....	.87	.33	1.19	.47	1.26	.54	1.41	.67	1.53	.78	1.88	.93	2.45	1.24
1907.....	1.42	.43	1.43	.48	1.30	.56	1.46	.70	1.82	.85	2.09	.98	2.78	1.26
1908.....	1.34	.42	1.26	.50	1.44	.61	1.69	.75	1.91	.90	1.74	1.14	3.65	1.50
1909.....	1.34	.36	1.16	.36	1.46	.46	1.59	.56	1.58	.62	1.67	1.07	1.91	1.18
1910.....	1.00	.29	.99	.35	1.12	.43	1.19	.52	1.49	.66	1.52	.85	1.72	1.14
1911.....	1.01	.27	1.02	.32	1.17	.40	1.36	.52	1.64	.67	1.50	.75	1.82	1.08
1912.....	1.06	.25	1.08	.33	1.20	.39	1.46	.56	1.63	.67	1.70	.88	1.76	.98
1913.....	1.02	.26	1.07	.29	1.35	.38	1.53	.58	1.74	.75	1.93	1.08	2.20	1.28
1914.....	.78	.28	1.08	.45	1.32	.51	1.44	.69	1.56	.89	1.69	1.34	2.11	1.41
1915.....	.58	.19	1.12	.42	1.25	.51	1.56	.67	1.63	.89	1.89	1.18	1.78	1.45
1916.....	.76	.25	1.00	.36	1.05	.43	1.31	.62	1.49	.72	1.87	1.13	2.11	1.16
1917.....	.79	.40	.85	.44	.96	.56	1.11	.68	1.19	.95	1.25	1.31	1.31	1.37
1918.....	.77	.42	.98	.66	1.47	.92	1.56	1.14	1.71	1.78	2.02	2.49	2.16	2.79
1919.....	.80	.60	1.68	.84	1.91	1.01	1.92	1.29	2.38	1.54	2.59	2.71	3.62	3.36

TABLE No. 13.—*Contract prices for materials for 15 years.*

Year	Cement per barrel.	Sand per cubic yard.	Gravel per cubic yard.	Terra-cotta pipe, linear foot.						
				8-inch-	10-inch.	12-inch.	15-inch.	18-inch.	21-inch.	24-inch.
1905	\$1.13	\$0.81	\$0.85	\$0.14	\$0.20	\$0.29	\$0.40	\$0.50	\$0.74	\$0.96
1906	1.35	.85	1.05	.125	.1647	.2236	.2997	.3672	.5454	.7263
1907	1.55	.74	.97	.155	.195	.261	.353	.443	.5454	.848
1908	1.52	.84	1.04	.155	.225	.30	.405	.51	.75	.975
1909	1.20	.55	.75	.155	.1707	.239	.3233	.4066	.5975	.7775
1910	.975	.54	.65	.125	.15	.20	.27	.3825	.5625	.73125
1911	.99	.395	.485	.115	.175	.22	.30	.42	.55	.715
1912	.98	.345	.435	.121	.176	.22	.31	.40	.59	.715
1913	.94	.345	.435	.105	.15	.18	.351	.494	.78	.845
1914	1.11	.54	.69	.11	.256	.25	.432	.608	.96	1.04
1915	1.04	.54	.69	.11	.23	.245	.43	.60	.96	1.04
1916	1.00	.54	.69	.11	.16	.21	.284	.40	.63	.6825
1917	1.33	.59	.74	.15	.23	.28	.39	.551	.90	.975
1918	1.95	.69	.99	.18	.42	.54	.72	1.00	2.00	2.25
1919	2.30	.95	1.35	.28	.4725	.6075	.8316	1.3785	2.23866	2.5498

TABLE NO. 14.—*Maintenance work, sewerage system, for 10 years.*

	1919	1918	1917	1916	1915
Main sewers cleaned.....feet..	4,043	595	5,467	3,743	4,885
Pipe sewers cleaned.....do..	175,917	169,582	189,796	156,773	156,773
Pipe sewer flushed.....do..	5,166,538	5,222,929	5,983,299	6,949,719	6,077,120
Manholes flushed.....	13,032	13,083	15,597	17,611	15,473
Sumps, regulators, gates flushed and in-spected.....	4,284	3,733	3,662	2,102	3,618
Basins flushed.....	21,322	17,984	17,938	15,793	15,242
Basins cleaned.....	32,986	30,481	39,256	45,514	51,291
Sludge removed:					
Pipe sewers.....cubic feet..	4,702	5,450	5,837	5,220	4,499
Basins.....do..	184,587	217,662	191,288	198,128	191,928
Sediment chamber.....do..	51,435	55,323	75,195	71,300	71,100
Screens.....pounds..	940,348	945,118	884,755	834,866	708,388
Main sewers inspected.....miles..	147.79	144.97	142.93	139.53	137.36
Pipe sewers inspected.....do..	978.50	980.00	1,133.00	1,316.00	1,150.00
Basins repaired.....	146	148	178	148	163

	1914	1913	1912	1911	1910
Main sewers cleaned.....feet..	1,113	4,525	4,071	300	1,185
Pipe sewers cleaned.....do..	145,767	123,545	122,838	161,190	149,626
Pipe sewers flushed.....do..	6,339,122	6,705,367	5,906,495	5,685,423	3,717,332
Manholes flushed.....	17,208	18,594	16,733	15,994	11,943
Sumps, regulators, gates flushed and in-spected.....	4,222	3,949	2,245	530	568
Basins flushed.....	18,586	18,416	5,293	11,950	18,884
Basins cleaned.....	45,502	40,244	38,760	60,379	57,753
Sludge removed:					
Pipe sewers.....cubic feet..	4,079	3,723	2,479	3,538	5,052
Basins.....do..	169,669	168,696	147,741	166,428	190,294
Sediment chamber.....do..	62,856	66,744	53,140	58,131	58,577
Screens.....pounds..	798,666	869,640	1,084,128	833,617	890,230
Main sewers inspected.....miles..	134.00	130.90	126.24	122.78	114.00
Pipe sewers inspected.....do..	1,200.00	1,270.00	491.47	469.42	448.78
Basins repaired.....	124	117	141	155	249

TABLE No. 15.—*Summary of sewerage system for 25 years.*

Fiscal year.	Total length.			Total cost.		Actual cost maintenance and operation.	
	Trunk sewers.	Pipe sewers.	All sewers.	Sewerage system. ¹	Sewage-disposal system.	Sewerage system	Sewage-disposal system ²
1895.....	74.48	260.20	334.68	\$8,298,931.62	..	\$45,000.00	..
1896.....	77.65	270.20	347.93	\$8,476,431.62	..	45,000.00	..
1897.....	81.36	284.06	365.42	\$8,661,731.62	..	45,000.00	..
1898.....	83.92	298.91	382.93	\$8,901,731.62	..	50,000.00	..
1899.....	85.65	307.36	393.01	\$9,047,731.62	..	50,000.00	..
1900.....	88.39	317.20	415.50	\$9,309,731.62	..	50,000.00	..
1901.....	90.89	327.86	418.75	\$9,515,731.62	..	50,000.00	..
1902.....	93.49	338.13	431.62	\$9,696,731.62	..	50,000.00	..
1903.....	96.31	351.73	448.04	\$9,817,731.62	..	50,000.00	..
1904.....	99.12	357.70	456.82	\$9,940,731.62	..	50,000.00	..
1905.....	103.21	365.60	468.81	\$10,046,881.62	..	50,000.00	..
1906.....	109.09	375.26	484.35	\$10,128,881.62	..	42,000.00	..
1907.....	112.20	389.24	501.44	\$10,363,881.62	\$3,714,823.00	38,000.00	\$3,837,205.30
1908.....	113.94	407.24	521.18	\$10,546,881.62	3,952,768.65	44,500.00	3,987,625.00
1909.....	117.24	424.02	541.26	\$10,688,881.62	4,051,888.27	45,000.00	38,000.00
1910.....	119.20	448.78	567.98	\$10,860,556.62	4,095,630.70	48,500.00	58,000.00
1911.....	122.78	469.42	592.20	\$11,244,188.79	4,146,228.01	50,000.00	58,000.00
1912.....	126.01	492.52	618.53	\$11,539,374.29	4,228,555.94	50,000.00	50,000.00
1913.....	130.90	513.38	644.28	\$11,922,177.04	4,366,524.43	50,000.00	50,000.00
1914.....	133.50	527.99	661.49	\$12,470,940.74	4,495,830.13	50,000.00	62,000.00
1915.....	137.36	544.75	682.11	\$13,032,082.86	4,624,186.31	50,000.00	64,000.00
1916.....	139.53	562.53	702.06	\$13,294,695.25	4,671,279.19	50,000.00	64,500.00
1917.....	142.93	574.44	717.37	\$13,509,830.21	4,685,165.71	50,000.00	64,500.00
1918.....	144.97	585.87	730.84	\$13,949,036.45	4,720,324.92	50,000.00	64,500.00
1919.....	147.79	591.03	738.82	\$14,231,065.00	4,803,662.25	50,000.00	61,500.00

¹ Exclusive of sewage-disposal system.² The sewage-disposal system went into operation July 1, 1906.³ Handling a part of the sewage only during these years.TABLE No. 16.—*Rights of way acquired for sewer extension, fiscal year 1919.*

For combined system trunk sewer (Rock Creek main interceptor) line of Twenty-eighth Street, between Calvert Street and Rock Creek Drive through parcels 53/4, 53/5, and 53/6, and lots 15, 16, 17, 18, 813, and 815.³

For combined system trunk sewer (Piney Branch trunk) in line of Spring Road extended between Spring Place and Sixteenth Street NW., through parcel 83/20.²

For separate system sewer along line of the Metropolitan Branch of the Baltimore & Ohio R. R. through parcel 104/100.²

For separate system sewer along line of the Metropolitan Branch of the Baltimore & Ohio R. R. through lot 20, square 3184.¹

TABLE No. 17.—*Electric conduits laid July 1, 1918, to July 1, 1919.*

Number of ducts.	Potomac Electric Power Co.		Chesapeake & Potomac Telephone Co.		Capital Traction Co.		Western Union Telegraph Co.		Total.	
	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.
1.....	Feet. 2,696	Feet. 2,696	Feet. 1,345	Feet. 1,345	Feet. 67	Feet. 134	Feet. 853	Feet. 1,706	Feet. 13,896	Feet. 4,041
2.....	638	1,276	12,338	24,676	..	..	..	..	200	600
3.....	29	87	171	513	..	..	..	..	..	..
4.....	24,551	98,204	2,068	8,272	..	..	..	1,736	6,944	28,355
6.....	..	..	7,119	42,714	..	..	..	..	7,119	42,714
8.....	..	..	7,895	63,160	..	..	..	..	7,895	63,160
10.....	..	..	560	5,600	..	..	..	..	560	5,600
11.....	..	..	..	..	..	..	258	2,838	258	2,838
18.....	..	..	1,494	26,892	..	..	..	..	1,494	26,892
20.....	..	..	2,492	49,840	..	..	160	3,200	2,652	53,040
24.....	..	..	..	..	26	624	..	..	26	624
32.....	..	..	30	960	..	..	..	..	30	960
Total.....	27,914	102,263	35,512	223,972	93	758	3,007	14,688	66,526	341,681

¹ Consideration paid.² Voluntary dedication.

TABLE No. 18.—*Summary of electric conduits laid from Mar. 27, 1900, to July 1, 1919.*

Number of ducts.	Potomac Electric Power Co.		Chesapeake & Potomac Telephone Co.		Capital Traction Co.		Washington Rwy. & Electric Co.	
	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.
	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
1.	88,229	88,229	57,432	57,432				
2.	160,819	321,638	341,587	683,174	15,809	31,618	13	26
3.	205	795	6,097	18,291				
4.	549,480	2,197,920	201,563	806,252	23,652	94,608	33,414	133,656
5.								
6.	46,127	276,762	115,695	694,170	8,173	49,018	5,117	30,702
7.			82	574	29	203		
8.	101,063	808,504	67,766	542,128	15,304	122,432	19,086	152,688
9.	7,325	65,925	114	1,026				
10.	850	8,500	30,260	302,600	32	320	8,275	82,750
11.								
12.	52,935	635,220	14,278	171,336	908	10,896	11,458	137,496
13.	374	4,862	212	2,756				
14.	1,224	17,136	3,831	53,634	4,306	60,284	1,880	26,320
15.	68	1,020			28	420		
16.	6,180	98,880	9,276	148,416	1,042	16,672		
17.			636	10,812				
18.			5,643	101,574			2,214	39,852
19.	1,079	21,580	4,471	89,420	1,362	27,240		
20.			823	18,106	9,109	200,398	134	2,948
21.			3,069	73,656	26	624		
22.	3,176	76,224	304	7,600				
23.			126	3,276	280	7,280		
24.	2,227	62,356					87	2,436
25.	53	1,590	313	9,390				
26.	77	2,464	515	16,480	1,002	32,064		
27.	3,854	138,744	26	936	125	4,500		193
28.								7,334
29.			1,589	63,560				
30.	446	19,624						
31.			749	41,944				
32.	7	406						
33.	106	6,784	176	11,264				
34.			53	3,710				
35.			118	8,496				
36.			35	2,870				
Total.	1,025,964	4,855,163	866,839	3,944,883	81,187	658,597	81,871	616,208

Number of ducts.	Western Union Telegraph Co.		Postal Telegraph Co.		Total.	
	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.
	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
1.	515	515	13,831	13,831	160,007	160,007
2.	4,262	8,524	1,126	2,252	523,616	1,047,232
3.	6,975	20,925			13,337	40,011
4.	9,729	38,916	35,428	141,712	853,266	3,413,064
5.	4,177	20,885			4,177	20,885
6.	4,232	25,392	17,313	103,787	195,657	1,179,942
7.					111	777
8.					1,140	9,120
9.					204,359	1,634,872
10.					7,439	66,951
11.	183	1,830			39,600	396,000
12.	258	2,838			258	2,838
13.					79,862	958,344
14.	309	4,017			895	11,635
15.					11,241	157,374
16.	44	660			140	2,100
17.					16,498	263,968
18.					636	10,812
19.					7,857	141,426
20.					7,072	141,440
21.	160	3,200			10,066	221,452
22.					6,271	150,504
23.					304	7,600
24.					406	10,556
25.					2,314	64,792
26.					366	10,980
27.						
28.						
29.						
30.						

TABLE No. 18.—*Summary of electric conduits laid from Mar. 27, 1900, to July 1, 1919—Continued.*

Number of duets.	Western Union Telegraph Co.		Postal Telegraph Co.		Total.	
	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.
	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
32.....					1,594	51,008
36.....					4,005	144,180
38.....					193	7,354
40.....					1,589	63,560
44.....					446	19,624
56.....					739	41,944
58.....					7	406
64.....					282	18,048
70.....					53	3,710
72.....					118	8,496
82.....					35	2,870
Total.....	30,844	127,702	69,121	274,189	2,155,826	10,476,742

This table does not include 14,598 feet of United States Government conduit and 660.6 feet of private conduit.

TABLE No. 19.—*Electric conduits, lengths laid each year to July 1, 1919.*

Fiscal year.	Potomac Electric Power Co.		Chesapeake & Potomac Telephone Co.		Capital Traction Co.		Washington Rwy. & Electric Co.	
	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.
Laid prior to Mar. 27, 1900.....	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>
1901.....	343,885	1,813,866	79,920	198,920	48,218	399,851	75,743	569,332
1902.....	16,387	65,952	876	4,90			88	704
1903.....	8,098	89,958						
1904.....	24,655	105,592	123,634	640,448				
1905.....	15,035	65,412	35,905	138,649				
1906.....	13,798	56,892	39,409	147,002				
1907.....	50,057	287,311	80,433	278,683				
1908.....	38,053	232,741	75,110	281,405	5,285	29,452		
1909.....	39,705	154,940	58,005	228,725	23	92		
1910.....	58,07	235,224	45,919	172,718	11,719	90,660	859	6,644
1911.....	46,096	159,422	56,582	130,859	2,3	1,788	420	1,803
1912.....	56,029	240,518	44,822	297,752	913	6,318		
1913.....	(3,841	33,353	19,916	45,697	9,417	58,548	42	168
1914.....	39,883	146,117	22,980	64,630	2,300	18,400		
1915.....	45,018	170,578	24,391	51,778			34	13
1916.....	35,488	130,400	19,059	48,938				
1917.....	40,894	104,136	16,847	35,513	1,230	37,254	15	60
1918.....	31,547	115,964	32,045	118,132	142	2,384		
1919.....	30,374	161,434	51,854	326,322	1,534	12,892		
Total.....	1,025,964	4,855,073	866,839	3,944,883	81,187	658,597	81,871	616,208

TABLE No. 19.—*Electric conduits, lengths laid each year to July 1, 1919—Contd.*

Fiscal year.	Western Union Telegraph Co.		Postal Telegraph Co.		Total.	
	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.
	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
Laid prior to Mar. 27, 1900.						
1901					5,2,429	3,500,913
1902					17,351	71,346
1903					8,098	89,938
1904					148,259	746,040
1905					51,510	24,061
1906					37,877	211,254
1907	10,635	44,995			141,125	610,989
1908	383	1,710			118,831	5,5,508
1909	11,413	51,775			109,195	135,532
1910	2,322	7,515			119,476	512,811
1911	329	652			103,90	314,525
1912			531	531	102,295	545,119
1913			50,238	232,992	143,504	673,758
1914			2,915	15,704	8,058	244,851
1915	607	1,214			70,050	223,706
1916	7,3	1,474	410	2,40	55,720	183,272
1917	680	3,153	311	3,558	10,333	213,674
1918	355	526			64,898	231,000
1919					80,702	500,648
Total.	3,007	14,688			66,523	341,681
	30,844	127,702	69,121	274,189	2,155,826	10,476,652

TABLE No. 20.—*Gas mains, laid by sizes, July 1, 1918, to July 1, 1919.*

Size of mains.	Washington Gas Light Co.	Georg- town Gas Light Co.	Total.	
			Linear feet.	Linear feet.
2-inch	667	410	1,077	
4-inch	4,060	2,583	6,643	
6-inch	7,292	2,202	9,494	
8-inch	3,428	—	3,428	
12-inch	2,908	—	2,908	
16-inch	371	—	371	
20-inch	52	—	52	
Total.	18,778	5,195	23,973	

TABLE No. 21.—*Gas mains, laid by sizes, July 1, 1907, to July 1, 1919.*

Size of mains.	Washington Gas Light Co.	Georg- town Gas Light Co.	Total.	
			Linear feet.	Linear feet.
1½-inch				
2-inch	9,298	3,120	12,415	
2½-inch	6,873	1,895	8,768	
3-inch		620	620	
4-inch	5,983	—	5,983	
6-inch	225,804	45,547	271,351	
8-inch	265,257	62,350	327,607	
10-inch	17,224	32,688	49,912	
12-inch	5,493	4,107	9,600	
16-inch	78,644	38,638	117,282	
20-inch	7,330	234	7,564	
24-inch	10,747	—	10,747	
30-inch	9,778	—	9,778	
Total.	642,830	189,199	832,089	

TABLE No. 22.—*Gas mains, lengths laid by years, July 1, 1907, to July 1, 1919.*

Fiscal year.	Washington Gas Light Co.	Georg- town Gas Light Co.	Total.
	Linear feet.	Linear feet.	Linear feet.
1907.....	36,605	8,450	45,055
1908.....	61,642	19,777	81,419
1909.....	83,692	25,498	109,190
1910.....	69,237	2,202	71,439
1911.....	48,192	10,983	59,175
1912.....	88,583	50,178	138,761
1913.....	61,234	11,688	72,922
1914.....	48,475	5,839	54,313
1915.....	45,274	14,415	59,690
1916.....	29,577	24,940	45,517
1917.....	19,779	5,864	25,613
1918.....	31,822	4,170	35,992
1919.....	18,778	5,195	23,973
Total.....	642,890	189,199	832,089

REPORT OF THE MUNICIPAL ARCHITECT.

WASHINGTON, D. C., September 20, 1919.

SIR: I have the honor to forward herewith the tenth annual report of the office of the municipal architect for the fiscal year ending June 30, 1919.

During the year eight buildings were under construction, as follows:

Building.	Appropriation available.	Cost.	Completed or to be completed.
Fish wharf and market, Water Street, between Eleventh and Twelfth Streets SW.....	Mar. 3, 1915	\$116,476.77	June 1, 1918
Lumber for sheds.....		658.00	Apr. 1, 1918
Improvements on buildings adjoining.....		360.00	June 10, 1918
Electric lighting fixtures, etc.....		1,000.00	June 3, 1918
Removal of old structures.....		100.00	July 11, 1918
Extra allowance for pipe covering.....		226.98	
Structural steel for shuckers' shed.....		278.00	Aug. 8, 1919
Construction of cold-storage room.....		5,975.60	Oct. 4, 1919
Changing gas piping in 25 stores.....		87.50	
Equipment for cold-storage room.....		1,236.00	Do.
Construction of pump house.....		750.00	Sept. 8, 1919
Wharf flushing system.....		2,788.00	Oct. 20, 1919
Elizabeth V. Brown School, No. 113, Connecticut Avenue, between McKinley and Northampton Streets NW.....	Sept. 1, 1916	67,972.86	Sept. 7, 1919
Moving boilers from Tenth Street wharf to site.....		175.00	
Installing B. & W. boilers.....		320.00	
Water radiators.....		379.85	
Radiator and drip traps.....		300.00	
Steam-heating system.....		4,700.00	Aug. 5, 1919
Heating equipment and materials.....		1,363.31	
Woodburn School, No. 101, addition for toilets, Riggs and Blair Roads, Woodburn.....	Sept. 1, 1916	5,500.00	Oct. 1, 1918
Benning School, No. 48, addition for toilets, Anacostia Road, between Benning Road and F Street NE.....	do.....	6,000.00	Do.
Foundry addition to McKinley Mammal Training School, No. 130, Seventh Street and Rhode Island Avenue NW.....	do.....	8,719.19	Aug. 17, 1918
Phelps School, No. 57, pavilion, Vermont Avenue, between T and U Streets NW.....	(1)	2,997.00	Do.
Portable school buildings.....	Aug. 31, 1918	135,000.00	Jan. 17, 1920
Furnaces.....		3,090.00	
Blackboards.....		1,516.76	Feb. 21, 1919
Head house and sheds on wharf used by the Norfolk & Washington Steamboat Co., Water Street at foot of Seventh Street SW.....	July 1, 1918	48,252.51	Sept. 25, 1919
Heating system.....		1,965.00	Sept. 1, 1919

¹ Community forums and civic centers, 1918.

Specifications and proposals were prepared for the following improvements:

Building.	Work.	Date of advertisement.
District of Columbia jail, hospital kitchen	Hood over range and cooking apparatus.....	July 10, 1918
Elizabeth V. Brown School.....	Heating system, old building.....	July 12, 1918
McKinley Manual Training School.....	Repairs to boiler.....	July 15, 1918
Truck house No. 1, and engine house No. 2.....	Placing grilles in doors.....	July 23, 1918
Mine Normal School.....	Overhauling thermostatic system.....	July 30, 1918
McKinley Manual Training School.....	Repairs to 2 boilers.....	Aug. 2, 1918
New Central High School.....	Extension furnace stack and capping with ventilator.....	Aug. 5, 1918
District of Columbia workhouse.....	Cupola for foundry.....	Do.
Smallpox hospital.....	New heating and ventilating system.....	Aug. 6, 1918
Peabody School.....	Machine shop equipment.....	Do.
New Central High School.....	One steel and 1 radial brick stack.....	Aug. 29, 1918
Elizabeth V. Brown School.....	Retubing two boilers.....	Do.
District of Columbia workhouse and reformatory.....	Installing toilets under stadium.....	Do.
Elizabeth V. Brown School.....	Installation of boilers.....	Aug. 30, 1918
Portable school buildings.....	Erection 2 radial brick stacks.....	Sept. 14, 1918
Do.....	Installation 3 water radiators.....	Sept. 19, 1918
Engine house No. 10.....	Erection 20 buildings.....	Sept. 20, 1918
Engine house No. 12.....	Completion of plumbing and electrical work.....	Sept. 20, 1918
Dunbar High School.....	Changing gas piping in 25 stores.....	Oct. 19, 1918
Portable school buildings.....	Installation of piping for central power and ice plants.....	Oct. 24, 1918
Do.....	Installation blackboards for 20 buildings.....	Oct. 30, 1918
Elizabeth V. Brown School.....	Installation ventilating furnaces, for 20 buildings.....	Do.
Dunbar High School.....	Steam heating system.....	Nov. 8, 1918
Do.....	do.....	Do.
Elizabeth V. Brown School.....	Installation of ash hoist.....	Dec. 3, 1918
Wilson Normal School.....	Installation of blackboards for 20 buildings.....	Dec. 6, 1918
Dunbar High School.....	Installation of ventilating furnaces for 20 buildings.....	Do.
Harbor patrol.....	Installation of radiator and drip traps.....	Dec. 10, 1918
Headhouse for Norfolk & Washington Steamboat Co.....	Installation of dark room vent stack.....	Do.
District of Columbia repair shop.....	Retubing water grate.....	Dec. 12, 1918
Petworth School.....	Restoration of broken marble newel.....	Dec. 17, 1918
Industrial Home School.....	Installation heating system.....	Dec. 27, 1918
Cardozo playground.....	Installation of 2 cast-iron lanterns and standards.....	Jan. 14, 1919
Reservation No. 126 playground, Virginia Avenue and Tenth Street SE.....	do.....	Do.
McKinley Manual Training School.....	Repairing wharf.....	Jan. 17, 1919
Dental clinic, at Curtis, Cleveland, and M Street High Schools.....	Construction.....	Feb. 7, 1919
Elizabeth V. Brown School.....	Slag roof for shed in storage yard.....	Feb. 17, 1919
McKinley Manual Training School.....	Construction of building.....	Feb. 20, 1919
Headhouse for Norfolk & Washington Steamboat Co., Schools.....	Setting slate treads.....	Feb. 27, 1919
Elizabeth V. Brown School.....	Construction swimming pool.....	Mar. 10, 1919
Towers School.....	do.....	Do.
Bradley School.....	Stack and cupola for foundry.....	Mar. 26, 1919
Blake School.....	Electrical work.....	Apr. 9, 1919
Mazruder School.....	Installation blow-off valve.....	Apr. 22, 1919
Fish wharf and market.....	Cupola for foundry.....	Apr. 28, 1919
Dunbar High School.....	Heating system.....	May 7, 1919
Fish wharf and market.....	Repairs to furnaces.....	May 8, 1919
Do.....	Equipment for heating system.....	May 12, 1919
Do.....	Repairs to furnaces.....	May 20, 1919
Do.....	Hot-air furnaces.....	May 29, 1919
Do.....	do.....	Do.
Do.....	do.....	Do.
Do.....	Construction of pump house.....	June 12, 1919
Do.....	Installation laboratory equipment.....	June 19, 1919
Do.....	Refrigerating equipment for cold-storage room.....	June 26, 1919
Do.....	Construction of cold-storage room.....	Do.

CUBIC COST OF BUILDINGS.

In the annual reports of previous years, tables have been submitted showing the cubic cost of buildings erected since 1896. The following table shows cost of buildings erected last year and now under construction.

Comparison in cost of Washington school buildings and repairs with cost in other cities for buildings of similar materials and construction, shows most favorably for this city.

Building.	Cost.	Cubic contents.	Cost per cubic foot.	Heating system.
40 portable school buildings.....	\$156,000	887,200	\$0.176	Furnaces.
Head house used by the Norfolk & Washington Steamboat Co., Water Street at foot of Seventh Street SW...	28,842	149,850	.19	Steam.

INCREASE IN COSTS.

Increase in cost of buildings is shown by comparison of the Norfolk & Washington head house, on the water front, with the fire-boat house, a short distance away. The head house is now being built at a cost of 19 cents per cubic foot. The fire-boat house was built in 1907 at a cost of 10.3 cents per cubic foot, and the latter is plastered throughout and trimmed and finished in better materials than we could afford at the head house.

RETARDATION OF WORK DURING THE WAR.

We were impressed by the necessity for the concentration of energy on war projects and the suspension of all work tending to interfere in any way with the necessary preparations to meet the emergency. The commissioners recognized the exigency by issuing orders classifying work according to the pressing public necessity and deferring all work that was not urgently required.

The President of the United States, through the Bureau of Education, advised that the educational equipment should be kept up in such a way that no child should suffer the loss of his schooling either during or following the war. We made great efforts to maintain the school buildings in usable condition and to provide for needed improvements and extensions, notwithstanding the abnormal conditions which retarded work of all kinds and especially construction and repairs, where skilled and unskilled labor was indispensable. The difficulties which confronted us may better be appreciated by calling attention to a few concrete examples:

This office lost 40 per cent of its force by transfer to Federal departments requiring technically trained men for war work. The repair division, which now has about 200 men, dropped down to 80 laborers and mechanics. At times the common or unskilled labor dropped so low and the organization was so unbalanced that the skilled labor and mechanics could not work. The Council of National Defense, through the War Industries Board, shut off the supply of building materials, and it was impossible to obtain steel, lumber, heating apparatus, hardware, or sheet metals. One short length of pipe, needed to complete some work which had been started before the war, had to be brought from Philadelphia by autotruck. Anticipating such a condition in the building business, Congress made a special appropriation for 60 portable school buildings, to be erected during the war and to take the place of permanent school buildings which could not be erected because of the scarcity of labor and materials. But the War Industries Board even refused to allow shipment of materials for these temporary buildings. After repeated efforts, extending over three months, and near the close of the war, they finally agreed to allow us to put up not more than 20 portable school buildings. Application was made for permission to obtain about 150 tons of reinforcing steel for the Municipal Hospital, but the Priorities Board would not allow it to be shipped even for a hospital. Machinery was needed to equip the shops at the New Central High School, and promises were made by the Shipping Board that permission would be given to ship it to the school. But the War Industries Board wrote to the contractor and informed him that it might be shipped if complete in all respects; but that if any part had to be made they would refuse permission. Nothing could be done until after the signing of the armistice to complete the educational equipment of this new school building.

The most striking example of the difficulties encountered in building construction during the war is afforded by the Chevy Chase School, as this work was advertised two days before war was declared, and extended through the trying period when men and materials were hard to obtain. At that time prices had begun to advance, and bids for heating the building exceeded the amount available. An excellent boiler was obtained from a Government building, but great difficulty was experienced in obtaining bids to haul it to the Chevy Chase School. After several months' delay, it was delivered about

August 20, 1917. Bids were then solicited for the boiler parts and attachments necessary to install the boilers in the new position, but no bids could be obtained as all boiler makers were engaged on war work, and not until six months later could we obtain proposals for these boiler parts. They were ordered in January, 1918, and were not delivered until six months after the order had been placed, or in June, 1918. After the receipt of these boiler parts, and 16 months after the work was first advertised, we again advertised for proposals to install the boilers and the heating apparatus; but by this time prices had advanced so rapidly that the lowest bid exceeded the balance of the appropriation, notwithstanding that \$15,000 additional had been appropriated; so that nearly 18 months after the work was first advertised, the municipal architect was directed to install the heating plant by day labor and subcontracts. The next difficulty was experienced in obtaining bids for lowering the boilers into position in the boiler room. The contractors, who have the appliances for such work, were so busy with Government war work that they would not give us a reasonable figure for this work, so this was done by employees of the District of Columbia repair shop inexperienced in the work. We then found that no steamfitters could be had to set the boilers, as all were employed on the temporary Government buildings, and that no bricks for setting the boilers could be purchased, and none had been made during the year at Occoquan. We therefore tore down an old building to get bricks to set the boilers. In October, 1918, the manufacturers of the boilers sent a boiler maker from Philadelphia to set up the boilers.

The priorities committee of the War Industries Board refused to permit the shipment of radiators, and it was then necessary to dismantle a vacant school building in order to obtain the necessary radiation for this work. We then found it impossible to get steamfitters, as they would not work on the eight-hour basis when they could obtain Federal Government work on 10 and 12 hours' pay, while District work was limited by law to eight hours per day. In December, 1918, after the signing of the armistice, we were able to make a contract for the installation of this work. These are fair samples of the delays and difficulties experienced in all work undertaken during the war. At the McKinley Manual Training School, where we built a new foundry, the same impediments were met, and even some of the contractors who were induced to submit bids, stated frankly, in their proposals, that the prices were too high, but that they were compelled to protect themselves in the face of advancing wages and scarcity of labor. One bidder stated that his proposal was twice as much as prewar prices, and advised that the work be postponed.

I quote from letters of contractors, showing the difficulty in getting materials shipped into Washington during the war:

"We are extremely sorry we have been unable to apply the asphalt damp-proofing on the floor of the Chevy Chase School before this and have been trying for three months to get the shipment of asphalt into Washington, but owing to the embargo it has been impossible to do so. We finally succeeded in getting it to Philadelphia by rail and from Philadelphia to Baltimore by boat from which point we loaded it on the electric line and understand it is now in Washington but not placed so that we can get to the car."

"* * * The entrance of our country into a state of war shortly after we were awarded this contract affected the labor situation very materially so that both skilled and common labor left practically all private work to go on the Government undertakings. As we were permitted to work only eight hours per day, limiting the amount the men could earn, while on Government work they were not so restricted, they were able to earn twice if not more the amount it was possible with us. When this rush period was over we were into the winter months and on account of exceedingly cold weather it was not possible to get the building closed in so that the work could be pushed to completion. The continued war conditions made it impossible for us to secure sufficient common labor to complete the excavation as anticipated, consequently about four and a half months were consumed in moving about 2,900 cubic yards of earth. * * *"

In the commissioner's order of June 19, 1917, it is required that "all departments" will submit, on or before June 1, list of repairs for the premises they occupy. This is seldom complied with. This list is then to go to the municipal architect for estimates and amplification, if necessary. These lists are then to be returned to the heads of departments, "who will make lump-sum allotments to the municipal architect from their proper appropriations." It

has been found impossible to obtain lump-sum allotments in sufficient amount to care for the necessary repairs, and most of the departments send in separate or individual requests at "any time the spirit moves them," and demand special estimates on each request, and then make allotments accordingly through the year and generally near the end of the fiscal year. When all other expenditures have been met, the balance, large or small, is turned over to the superintendent of repairs too late to do the work before the expiration of the fiscal year. A reallocation is required about January 1, "for the last six months of the fiscal year, the head of the department, not the municipal architect, being given an opportunity to increase or decrease the allotment," and "when the head of a department has surplus funds on hand, he may increase the allotment to the municipal architect and may state the purpose for which such funds are to be used."

It will be seen from these provisions: (1) The repair lists are made by heads of departments, and not by the municipal architect or superintendent of repairs, (2) that the head of a department may increase or decrease allotments in the middle of the fiscal year, and (3) that near the close of the fiscal year the head of other departments may turn over "surplus funds," and stipulate how they shall be spent in repair and improvement of the buildings. This works as a hardship on the superintendent of repairs, as he has no repair lists that may be depended upon for continuous operations. He does not know how much will be allotted from time to time, and can not plan in advance for the proper and economical expenditure of the funds. And worst of all he must accept the funds and make such repairs as the heads of other departments may direct. Here we have the head of one department, charged by law with the duty of constructing and repairing all District buildings, subject to the directions of another and coequal head of a department, charged by law with totally different duties, as to the manner and means by which the former shall perform his prescribed duties.

On October 11, 1916, the commissioners appointed an assistant engineer for the purpose, as expressed by the Engineer Commissioner, "that the best administrative results would be secured by taking on an additional employee and giving him supervision over the repair work." After about 18 months' experience in the repair shop, this official submitted the following report:

"The responsibility for the condition of buildings at present is upon the head of the departments (E. D. No. 130674, second indorsement, Feb. 2, 1916). This is certainly an incongruous policy, for it makes the doctor, social worker, schoolmaster, policeman, fireman, etc., responsible for something entirely without his sphere, and sets aside the professional opinion and experience of the architect, engineer, and those skilled in the construction and repair of buildings. Appropriations, as now made by Congress for each department, include money for repairs, personal services, and a host of other items, ranging from the purchase of coal to the running of an automobile, with no specific amount allotted for repairs of buildings and equipment. This combination of making the head of the department responsible for the condition of the building and no definite amount specified for repairs allows the head of the department to expend as little as he desires on the repair items, and the buildings as a result, are depreciating at an unwarranted rate. Under the order of June 19, 1917, the head of the department has a very considerable control over the allotment made to the repair shop (see par. 8) which should not be, as it is possible for the allotment to be decreased by the head of the department in order to care for other activities, the condition of the building suffering accordingly."

The 160 schools, 58 portables, 12 police stations, 38 engine houses, and the police court have special appropriations for repairs. All other District buildings, about 100 in number, have no special appropriations for repairs and must now be kept up by the allotments above mentioned from appropriations for maintenance or contingent funds. A very conservative estimate of the average amount needed for repair of these hundred buildings is \$300 per building per annum. I would recommend that an appropriation of \$30,000 be made to cover the repairs on all District buildings, not now provided for by special appropriations for repairs, and that the \$10,000 heretofore appropriated for District buildings when damaged by fire, be appropriated in this amount each year as an annual appropriation. At the present time there are no funds with which to repair buildings damaged by fire, and the law prohibits insurance. Any

nusued balance on this appropriation would be covered into the Treasury at the end of the fiscal year.

RECOMMENDATIONS IN ANNUAL REPORTS.

I beg to refer briefly to recommendations made in previous reports. I feel that many of the recommendations "for changes in the service deemed advisable," however meritorious, are frequently lost in the mass of statistical records necessary in such reports, and others can not be put in practice without appropriations to make them effective. I believe, as the Commission for Consolidation of Schools, that provisions for the physical extension and equipment of buildings should be made by those who are responsible for the planning and construction of the buildings. I also believe that the actual conditions in and about the buildings and the needs and requirements are better understood by those who have had charge of the planning and construction of the buildings for many years than they are by those who have temporary direction over the use of the buildings. I am confident that the former have more reliable data relating to the buildings and the needs and purposes of the buildings than the latter possess. I have felt it my duty to make such recommendations as I believe to be in the interest of economy and improvement in the service, although the initiation of such reforms and improvements may depend upon the cooperation of other departments.

In the annual report of 1910 I should like to call attention to the paragraph on the "time to make repairs." To the recommendation for "central heating plants," "to the use of portables," "for open-window schools," instead of interfering with the mechanical ventilation in permanent buildings; to the paragraph relating to unilateral and bilateral lighting; to remarks on "removal of ashes and rubbish," from District buildings, and to the committee report to Congress including this subject; to the statutory requirement that janitors shall assist in making minor repairs; to the limitation (\$100,000) of expenditures for personal services in proportion to the amount of work under construction, or else on a per cent limitation instead of an arbitrary sum which bears no relation to the amount of work that must or can be done during the fiscal year. In the report of 1911 it is shown that the services of inspectors at that time was 1.54 per cent of the cost of buildings then under construction. While the wages of inspectors and draftsmen have increased about 50 per cent since that time, the cost of buildings, due principally to an advance of about 100 per cent in laborers' and mechanics' wages, has also increased accordingly, so that a limitation allowance of 1.5 per cent on the cost of the work for inspection, and 1.5 per cent for draftsmen, copyists, and other per diem employees would probably meet the needs.

In the 1913 report I would invite attention to paragraph under "Heating plants and fuel," which shows the very careful survey of consumption of fuel in the school buildings, the arrangements for using a cheaper grade of coal in down-draft, smokeless boilers, and the saving effected by the first central heating plant, which serves three school buildings. In the 1914 report, under this heading, a saving of \$12,000 a year is shown as the result of the central plant with the changes in heating apparatus to adapt them to the use of soft coal.

In the 1917 report I would invite attention to the paragraph dealing with the rapid advance in the cost of buildings between the time the estimates were prepared and the appropriations were made available. The proposals for 11 buildings overran the appropriations, and most of the buildings were constructed by this office with day labor.

I would like to renew certain recommendations in the 1918 report, which shows the difficulties in doing work during the war and the increase in cost of buildings which has reached an advance of 100 per cent with no prospect of reduction within the next year.

I invite attention to that part of the 1918 report relating to a Government commission of competent engineers or heating experts to settle the controversy over the "open-window" method versus mechanical ventilation. If the former method is satisfactory, we are not justified in spending \$150,000 a year in ventilating systems. I commend the report of our heating, ventilating, and sanitary engineer in the 1918 report, and again recommend early action by the commissioners on this question.

REPORT OF THE SUPERINTENDENT OF REPAIRS.

I submit herewith the report of the superintendent of repairs, showing the expenditures for repairs on all buildings belonging to the District. Formerly this report was made to show the cost of separate items of labor, materials and contracts for each building, and the books are kept in such a way at the repair shop that a statement in detail can be given when required. But a detailed statement of cost for each of the 300 buildings was considered too voluminous to include in this annual report.

Since July, 1914, the repair lists for the schools, in accordance with the commissioners' orders, have been prepared by taking the requests for repairs as they come from the board of education and estimating on each item, and adding only such items as appear absolutely necessary for the preservation of the buildings. These requests, in the first instance, emanate from the teachers, through the principals, to the supervisor of the school division, and then to the assistant superintendent of schools. He then sends them, through the secretary of the board of education, to the municipal architect. The lists, after approval, become a working schedule.

Questions have been raised lately, by teachers or others in the colored schools, as to their share in the expenditure of repair funds. I must confess that this office, before such a question was raised, did not know what proportion of the funds had been spent on colored schools, as no distinction of any kind had been made either in the preparation of repair lists or in the book-keeping which would show the relative expenditure on white and on colored schools. I have a statement of these expenditures for the past five years, as follows:

Fiscal year ending June 30, 1915:

Public schools, repairs to buildings—	
White schools	\$60,483.22
Colored schools	20,925.05
Total	<u>81,408.27</u>

Fiscal year ending June 30, 1916:

Public schools, repairs to buildings—	
White schools	68,945.12
Colored schools	22,822.46
Total	<u>91,767.58</u>

Fiscal year ending June 30, 1917:

Public schools, repairs to buildings—	
White schools	88,573.80
Colored schools	37,793.48
Total	<u>126,367.28</u>

Fiscal year ending June 30, 1918:

Public schools, repairs to buildings—	
White schools	86,500.51
Colored schools	33,044.72
Total	<u>119,545.23</u>

Fiscal year ending June 30, 1919:

Public schools, repairs to buildings—	
White schools	123,867.74
Colored schools	55,630.59
Total	<u>179,498.33</u>

In the count made of pupils in actual attendance, we found that in the 7 high schools there are 6,209 pupils, of whom 1,286 are colored and 4,923 white. In the graded schools, there are 38,693, of whom 11,187 are colored and 27,506 are white. If the total amount expended in repairs, in five years, is divided by the total number of pupils, counted as present at one time, it would represent

an expenditure of \$14.044 per pupil, in five years. If the amount expended in repairs on white schools, in five years, \$452,053.21, is divided by 32,429 white pupils, counted as present at one time, it would be at the rate of \$13.939 per white pupil, or less than the general average. If the amount expended for colored schools, in five years, \$178,560.57, is divided by the 12,473 colored pupils present at one time, it would be at the rate of \$14.315 per colored pupil, or above the general average, and above the amount spent for each white pupil.

REPORT OF THE CONSTRUCTING ENGINEER AT THE DISTRICT OF COLUMBIA WORKHOUSE AND REFORMATORY.

This report covers the operations at the workhouse and reformatory and gives the cost of work as accurately as possible under the system of book-keeping used at the workhouse. I am advised that the system has been changed and that hereafter the constructing engineer may be able to obtain the necessary data from the books of the institution to give accurate statements of cost and show the charges to the several appropriations.

TABLE SHOWING SALARIES IN OTHER CITIES IN COMPARISON WITH SALARIES IN THIS OFFICE.

I append hereto a table prepared for the Commission on Reclassification of Salaries, showing the pay for similar positions and similar duties in 30 other cities. It will be noticed that in many other cities the architectural work is done by private architects, on a percentage commission, under the supervision of the city or school architect, while in this city most of the work is done by the municipal architect, or architects who are employed to assist in the preparation of plans at a reduced percentage for partial services only. I beg you to consider favorably the increase in salaries for this office force and that of the repair shop. I feel that they are absolutely necessary for the District's interest in maintaining a proper organization and gradation of employees. At present some of the subordinate employees are receiving more than those in higher and more responsible positions.

Respectfully submitted.

SNOWDEN ASHFORD,
Municipal Architect.

ASSISTANT TO ENGINEER COMMISSIONER.

Public schools, District of Columbia, 1919, repairs to buildings.

Appropriation	\$175,000.00
Credit by transfers (this includes 10 per cent for supervision)	18,310.87
Stock on hand June 30, 1918	33,979.66
	227,290.53

Expended as follows:

Carpentering—	
Labor	\$21,683.95
Material	14,534.39
Tinning—	
Labor	13,767.37
Material	7,812.31
Heating—	
Labor	10,597.71
Material	33,889.93
Plumbing—	
Labor	6,446.45
Material	1,832.56
Painting—	
Labor	14,242.48
Material	4,899.03
Glazing—	
Labor	1,796.84
Material	1,402.52

Expended as follows—Continued.

Steam fitting—		
Labor	-----	\$3, 920. 31
Material	-----	1, 022. 21
Grading—		
Labor	-----	5, 599. 55
Material	-----	1, 073. 92
Gas-engine and electrical work—		
Labor	-----	3, 432. 62
Material	-----	1, 558. 61
Miscellaneous—		
Labor	-----	15, 959. 84
Material	-----	7, 872. 73
Gas—		
Electricity	-----	97. 53
Ice	-----	130. 16
Forage	-----	36. 26
Coal	-----	4, 836. 15
Car tickets	-----	395. 26
Engineer stables	-----	325. 00
Property yard	-----	173. 50
Cement wharf	-----	25. 00
Blue printing	-----	100. 00
Telephone	-----	20. 64
Stock on hand, June 30, 1919	-----	13. 50
Balance	-----	47, 340. 04
		452. 16
		\$227, 290. 53

Fire Department, District of Columbia, 1919, repairs to engines.

Appropriation	-----	\$15, 000. 00
Credit by transfers (this includes 10 per cent for supervision)	-----	274. 18
		15, 274. 18

Expended as follows:

Carpentering—		
Labor	-----	\$6, 378. 95
Material	-----	2, 830. 77
Tinning—		
Labor	-----	596. 10
Material	-----	432. 89
Heating—		
Labor	-----	369. 08
Material	-----	326. 35
Plumbing—		
Labor	-----	894. 07
Material	-----	805. 11
Painting—		
Labor	-----	849. 45
Material	-----	611. 32
Glazing—		
Labor	-----	52. 69
Material	-----	49. 08
Steam fitting—		
Labor	-----	49. 50
Material	-----	39. 69
Grading—		
Labor	-----	174. 75
Material	-----	19. 92
Gas-engine and electrical work—		
Labor	-----	143. 67
Material	-----	73. 89
Gas, pro rata share	-----	6. 50
Electricity, pro rata share	-----	8. 70
Ice, pro rata share	-----	2. 42
Forage, pro rata share	-----	322. 41
Coal, pro rata share	-----	26. 35

Expended as follows—Continued.

Engineer stables, pro rata share-----	\$120.00
Property yard, pro rata share-----	12.66
Cement wharf, pro rata share-----	70.00
Blue printing, pro rata share-----	.39
Telephone, pro rata share-----	6.75
Balance-----	.72
	----- \$15,274.18

Metropolitan police, District of Columbia, 1919, repairs to stations.

Appropriation ----- \$8,000.00
Expended as follows:

Carpentering—	
Labor-----	\$1,071.50
Material-----	476.45
Tinning—	
Labor-----	775.84
Material-----	914.35
Heating—	
Labor-----	453.08
Material-----	1,161.74
Plumbing—	
Labor-----	682.76
Material-----	199.24
Painting—	
Labor-----	573.46
Material-----	433.01
Glazing—	
Labor-----	9.11
Material-----	4.35
Steam fitting—	
Labor-----	89.86
Material-----	56.72
Grading—	
Labor-----	14.17
Material-----	5.12
Gas-engine and electrical work—	
Labor-----	23.62
Material-----	18.66
Miscellaneous—	
Labor-----	456.96
Material-----	120.72
Gas, pro rata share-----	4.33
Electricity, pro rata share-----	5.80
Ice, pro rata share-----	1.62
Forage, pro rata share-----	214.94
Coal, pro rata share-----	17.56
Engineer stables, pro rata share-----	120.00
Property yard, pro rata share-----	10.00
Cement wharf, pro rata share-----	31.05
Telephone, pro rata share-----	6.75
Balance-----	47.03
	----- \$8,000.00

Courts, District of Columbia, 1919, repairs to buildings.

Appropriation ----- \$1,200.00
Expended as follows:

Carpentry—	
Labor-----	\$105.80
Material-----	24.56
Tinning—	
Labor-----	65.98
Material-----	30.42
Plumbing—	
Labor-----	146.52
Material-----	142.81

Expended as follows—Continued.

Labor	-----	\$148. 15
Labor	-----	148. 15
Material	-----	88. 21
Steam fitting—		
Labor	-----	89. 51
Material	-----	154. 58
Gas-engine and electrical work—		
Labor	-----	32. 41
Material	-----	13. 89
Stock on hand	-----	146. 00
Unexpended balance	-----	11. 16
		\$1, 200. 00

NOTE.—In addition to the repairs on the various school buildings, police stations, engine houses, and police court this shop did during the fiscal year 1919 \$41,549.74 worth of repairs on various buildings under the supervision of other officials of the District government.

Report of inspection of steam boilers, public schools, 1919.

School.	Num- ber of boilers.	High pres- sure.	Low pres- sure.	Tested.	Safety blows.	Date of inspection.	Remarks.
Armstrong Manual Training.	4	4	.....	200	110	June 29, 1918	Repaired fire box sides, furnished new tube tiles, new gaskets, new frame for grate.
Birney	2	2	.....	75	25	..... do	Installed new fuse plug, repaired brickwork, cleaned smoke pipe, new gaskets.
S. J. Bowen	1	1	.....	90	40	..... do	Repaired fire box sides, cleaned smoke pipe, new gasket.
Brightwood	1	.....	1	75	25	May 21, 1918	New glass in water column, safety gauge repaired, smoke pipes cleaned, new gaskets.
Brookland	2	1	.....	100	30	June 15, 1918	Replaced defective tubes, cleaned smoke pipe.
Do.	.....	.....	1	60	25	..... do	New gaskets, repaired fire box sides, furnished one new dead plate.
Business High.	3	3	.....	180	80	June 29, 1918	Cleaned smoke pipes, repaired fire-box sides, new gaskets.
Old Central High,	4	.....	3	75	20	June 3, 1918	Furnished new parts for stoker, repaired fire-box sides.
Do.	.....	1	.....	80	50	..... do	Cleaned smoke pipe, new gaskets.
New Central High.	4	4	.....	200	120	Sept. 2, 1918	New gaskets.
Congress Heights	2	2	.....	90	25	July 2, 1918	Repaired fire-box sides, cleaned smoke pipes, new gaskets.
Cranch	2	.....	1	75	25	May 23, 1918	Repaired fire box sides, cleaned smoke pipe, new gaskets.
Do.	.....	.....	1	75	25	June 10, 1918	Repaired fire box sides, cleaned smoke pipe, new gaskets.
Curtis	2	.....	2	75	25	.....	Repaired fire box sides, cleaned smoke pipe, repaired grates, new gaskets.
Dennison	2	.....	2	75	25	June 6, 1918	Furnished new gaskets, cleaned smoke pipe.
Dunbar High	3	3	.....	190	110	Sept. 2, 1918	Repaired fire box sides, cleaned smoke pipe, new gaskets.
Eastern High	2	.....	2	90	30	May 25, 1918	Furnished new gaskets, new tubes in west boiler, repaired brickwork.
Emery	2	.....	2	75	20	July 2, 1918	Repaired fire box sides, cleaned smoke pipe, new gaskets.
Force	2	.....	2	75	25	May 18, 1918	Repaired fire box sides, cleaned smoke pipes, new gaskets.
Franklin	2	.....	2	75	30	Aug. 19, 1918	Repaired fire box sides, cleaned smoke pipe, new gaskets.
Gales	2	.....	2	75	25	May 31, 1918	Do.

OPERATIONS OF THE ENGINEER DEPARTMENT.

127

Report of inspection of steam boilers, public schools, 1919—Continued.

School.	Number of boilers.	High pressure.	Low pressure.	Tested.	Safety blows.	Date of inspection.	Remarks.
Garnet.....	2	.....	2	75	20	June 5, 1918	Cleaned smoke pipe; furnished new set grates, new gaskets; repaired fire-box sides; repaired fire brick in fire box; repaired damper regulator.
Grant.....	2	2	.....	90	25	Aug. 19, 1918	Repaired fire-box sides, cleaned smoke pipes.
Henry.....	2	.....	2	75	20	June 3, 1918	Repaired fire-box sides, cleaned smoke pipes, repaired smoke pipes, repaired sewer in rear of boiler.
Jefferson.....	2	2	.....	60	30	July 11, 1918	Repaired fire-box sides, cleaned smoke pipe, tested steam gauge, repaired steam pump; new gaskets.
Lincoln School....	2	.....	2	75	25	June 1, 1918	Repaired fire-box sides, cleaned smoke pipes; new gaskets.
M Street power plant.	2	2	.....	190	110	Sept. 2, 1918	New gaskets; repaired fire-box sides; repaired stoker.
McKinley Manual Training. Do.....	6	6	.....	190	80	July 15, 1918	Repaired fire-box sides, cleaned smoke pipes, new gaskets, new tube tiles, repaired crown arches.
(1) Miner Normal....	2	2	.....	100	50	.....do.....	Repaired fire-box sides, cleaned smoke pipe, repaired pump and engine.
Park View.....	2	2	.....	160	80	Sept. 2, 1918	New gaskets.
Peabody.....	2	.....	2	75	40	Aug. 19, 1918	Repaired fire box sides, cleaned smoke pipes, re-tubed boiler, new gaskets.
1 upright boiler. Powell.....	2	2	.....	75	40	Aug. 19, 1918	Cleaned smoke pipes, repaired steam pump, new gaskets.
Seaton.....	2	.....	2	75	25	May 28, 1918	Repaired fire-box sides, cleaned smoke pipe, repaired safety gauge, new gaskets.
Stevens.....	2	.....	1	75	20	June 7, 1918	Repaired brickwork, cleaned smoke pipes, new gaskets, replaced some grates.
Do.....	.....	.....	1	60	25	.....do.....	New smoke pipe installed, new gaskets.
Summer.....	2	.....	2	80	25	July 15, 1918	Repair fire-box sides, cleaned smoke pipe, tested steam gauge, new gaskets.
Syphax.....	1	1	.....	100	40	July 11, 1918	Repaired fire-box sides, cleaned smoke pipe, some new grates, new gaskets.
Tenley.....	1	.....	1	75	25	June 14, 1918	Repaired fire-box sides, cleaned smoke pipe, some new grates, new gaskets.
Wallach.....	2	.....	2	75	20	July 11, 1918	Cleaned smoke pipes, new gaskets.
Webster.....	2	.....	2	75	20	June 7, 1918	Do.
Western High.....	4	.....	4	100	15	Aug. 19, 1918	Do.
Wilson Normal....	2	2	.....	180	80	.....do.....	Repaired fire-box sides, cleaned smoke pipes, repaired return, new gaskets.

SNOWDEN ASHFORD,
Municipal Architect.

REPORT OF THE CONSTRUCTING ENGINEER AT THE DISTRICT OF COLUMBIA WORKHOUSE AND REFORMATORY.

Following is the constructing engineer's report for the year ending June 30, 1919, for the workhouse and reformatory of the District of Columbia.

This year the assistant superintendent began a system of bookkeeping showing the exact cost of every job of repair and construction but he did not receive orders to start these records until toward the middle of the year, so that his books and those of the constructing engineer do not check on all items. However, all prices given in this report for material manufactured here, such as the prices for brick, crushed stone, sand, and lumber, also the cost of prison labor and teams, per day, are those given by the assistant superintendent which are used in his records for the different jobs.

These prices are as follows:

Brick, per thousand	\$12.00
Lumber, per thousand	20.00
Sand, per cubic yard	1.00
Stone, crushed, per cubic yard	1.28
Common labor (prisoners), per day	.50
Teams (with wagon)	4.00

CONSTRUCTION AND REPAIR WORK AT THE DISTRICT OF COLUMBIA REFORMATORY.

REST HALL, OFFICERS' QUARTERS AND HOSPITAL.

Material chargeable to the appropriation:

Glass	\$47.59
Miscellaneous material	7.25
	<hr/>
Force account chargeable to appropriation: Hired carpenters	\$54.84
	<hr/>
Total chargeable to the appropriation	134.84
	<hr/>

Brick, sand, crushed stone, and lumber:

Not over 500 brick or 1 cubic yard of sand or crushed stone was hauled from the workhouse wharf to the reformatory per load, so the cost of hauling is (using the assistant superintendent's price of \$4 per day per team) \$2.67 per 1,000 brick and \$1.33½ per cubic yard of sand or stone—
 Brick, 10,000, at \$14.67 (haul \$2.67, brick \$12) \$146.70
 Sand, 10 cubic yards, at \$2.33½ (haul \$1.33½, sand \$1) 23.33

Total for material produced on reservation	170.03
Cost of prison labor (using superintendent's price of \$0.50 per day):	
Plumbers, 23½ days	\$11.75
Painters, 15 days	7.50
Carpenters, 19 days	9.50
	<hr/>
Bought material and hired force	134.84
Material manufactured	170.03
Prison labor	28.75
	<hr/>
	333.62

MAIN BUILDING AND BAKERY.

Material chargeable to the appropriation:

Kitchen range, repairs	132.89
Electrical material	22.78
Miscellaneous material	7.90
Weather strips	7.40
Roofing material for repairs	358.01
	<hr/>
	528.98

Force account chargeable to the appropriation:

Hired carpenters-----	\$300.00
Bricklayers and cement worker-----	18.00
<hr/>	
Cost of prison labor:	
Carpenters, 59 days-----	29.50
Bricklayers, 5 days-----	2.50
Plumbers, 79½ days-----	39.75
Electrician, 2 days-----	1.00
Painters, 10 days-----	5.00
	<hr/>
	77.75
Total cost-----	<hr/> <u>924.73</u>

PUNISHMENT CELLS.

Material chargeable to the appropriations:

Cement-----	\$11.50
Lime-----	5.40
<hr/>	
Force account chargeable to the appropriations: Cement worker, 6 days-----	16.90
	<hr/>
Total chargeable to the appropriations-----	40.90
Reported last year-----	<hr/> 1,324.64
<hr/>	
Total cost of construction chargeable to the appropriations-----	1,365.54
Cost of prison labor: Cement workers, 76½ days-----	<hr/> 38.25
Total cost of work this year-----	<hr/> 79.15

TOTTEN HOUSE.

Material chargeable to the appropriations:

Paint-----	\$57.86
Electrical-----	58.32
Miscellaneous material-----	21.61
Screens-----	82.80
<hr/>	
Force account chargeable to the appropriations:	
Carpenters, 35 days-----	140.00
Bricklayer and cement worker-----	8.00
	<hr/>
Total chargeable to the appropriations-----	148.00

Quantity of lumber from sawmill unknown.	
Cost of prison labor:	
Carpenters, 67 days-----	\$33.50
Plumbers, 9 days-----	4.50
Electricians, 5 days-----	2.50
Painters, 64 days-----	32.00
Plasterers, 14 days-----	7.00
	<hr/>
Total cost not including native lumber-----	79.50

BOILER HOUSE.

Material chargeable to the appropriations:

Cement-----	\$132.20
Roofing-----	2.20
Contract price of chimney-----	<hr/> 1,630.00
<hr/>	
Total-----	1,764.40

Force account chargeable to the appropriations: Hired cement worker and foreman, 20½ days	\$82.00
Total chargeable to the appropriations	1,846.40
Credit to the District of Columbia for cement used by the chimney contractors	52.25
Actual cost of brick chimney	1,794.15
Brick, sand, crushed stone, and lumber:	
Sand, 11 cubic yards	25.67
Crushed stone, 16 cubic yards	41.81
	67.48
Cost of prison labor:	
Excavating, 6 days	3.00
Concrete work, 100½ days	50.25
Miscellaneous, 25½ days	12.75
	66.00
Total cost of chimney	1,979.88

Installation of second boiler.

Material chargeable to the appropriations:	
Cement	\$10.30
Miscellaneous material	65.56
Roofing	31.90
Steamfitting material	70.00
Grates	81.35
Fire brick	7.00
Paint	2.90
	269.01
Force account chargeable to the appropriations:	
Hired carpenters, 2½ days	10.00
Bricklayer, 15 days	60.00
	70.00
Total chargeable to the appropriations	339.01
Brick, sand, crushed stone, etc.:	
Brick, 3,000, at \$14.67	44.01
Sand, 6 cubic yards, at \$2.33½	14.00
	58.01
Cost of prison labor:	
Carpenters, 4½ days	2.25
Bricklayers, 26 days	13.00
Plumbers, 42½ days	21.25
Blacksmith, 3 days	1.50
	38.00
Total cost of installing second boiler	435.02
Total cost of installation of heating plant to date	
Previously reported	1,499.99
Chimney	1,979.88
Second boiler	435.02
	3,914.89

Repairs to boiler house.

Material chargeable to the appropriations:	
Electrical	17.98
Plumbing	7.02
Miscellaneous	2.50
Fire brick	5.00
Total	32.50
Force account chargeable to the appropriations:	
Bricklayer, 8½ days	34.00
Total chargeable to the appropriations	66.50

Cost of prison labor:	
Carpenter, 1 day	\$0.50
Bricklayers, 100½ days	50.25
Plumbers, 53 days	26.50
Blacksmith, 5½ days	2.75
Painters, 5 days	2.50

	\$82.50
Total cost of repairs	149.00
	=====

CONSTRUCTION OF OFFICER'S RESIDENCE NO. 1.

Material chargeable to the appropriations:

Cement	\$26.15
Lime	68.00
Plumbing material	502.64
Lumber	423.30
Tile	17.00
Building paper	17.00
Roofing paper	32.76
Slater's nails	8.00
Electrical	123.36
Slate	142.94
Miscellaneous	75.82
Paint	139.19
Hardware	69.09
Sheet iron	8.33

Total	1,653.58

Force account chargeable to the appropriations:

Carpenters, 169 days	676.00
Cement and bricklayers, 27 days	101.25
Plasterer, 33 days	123.75

Total	901.00

Total chargeable to appropriations this year

2,554.58	-----
Reported last year	164.29

Total cost to appropriations to complete residence No. 1	2,718.87
Brick, sand, crushed stone, and lumber:	
Brick, 19,950, at \$14.67	292.67
Sand, 10 cubic yards, at \$2.33½	23.33

Lumber (not reported)	
Total	316.00
Cost of prison labor:	
Carpenters, 474 days	237.00
Plumbers, 86 days	43.00
Cement workers and bricklayers, 107 days	53.50
Common labor, 223 days	111.50
Electricians, 14 days	7.00
Painting, 84½ days	42.25
Plasters, 117 days	58.50

Total	552.75
Total cost this year	3,403.83
Total reported last year	963.32
	=====
Total cost of residence No. 1	4,367.15

WORK ON THE SUPERINTENDENT'S RESIDENCE.

(See also Report of Workhouse.)

Material chargeable to the appropriations:

Electrical	\$41.77
Paint	91.28
Miscellaneous	56.70
Range	56.35
Tools	10.75
Cement	47.15
Lime	18.00
	\$322.00

Force account chargeable to the appropriation:

Carpenters, 57 days, at \$4	228.00
Bricklayer, 1 day, at \$3.75	3.75
	231.75

Total chargeable to the appropriations:

Manufactured material (See Workhouse report).

Cost of prison labor:

Carpenters, 137½ days	\$68.75
Plasterer, 1 day	.50
Stonework, 19 days	9.50
Electrician, ½ day	.25
	79.00

Total cost against the reformatory	632.75
	=====

POWER LINE TO DISTRICT OF COLUMBIA REFORMATORY.

(See Workhouse report.)

Material chargeable to the appropriation:

Copper trolley wire	\$1,219.30
No force account chargeable to appropriations.	

Total chargeable to appropriations	1,219.30
	=====

No manufactured material.

Cost of prison labor: Electrician, 140 days, at \$0.50	70.00
	=====

Total cost this year	1,289.30
	=====

Reported last year	\$414.89
	=====

Previously reported on power and telephone line	3,016.30
	=====

Total	4,720.49
	=====

COTTAGES FOR TUBERCULAR PATIENTS.

Material chargeable to the appropriations:

Electrical	\$0.92
Miscellaneous	1.53
	2.45

No prison labor reported.

Total reported last year	431.65
	=====

Total	434.10
	=====

MAIN SEWER EXTENSION AND SEPTIC TANK.

Material chargeable to the appropriations:

Cement	\$116.80
Lime	19.80
Miscellaneous	10.28
Sewer pipe	96.56
Tools	10.03
Plumbing material	22.68
Roofing	2.20
	278.35

Force account chargeable to the appropriations:

Carpenters, 37 days	\$148.00
Cement worker and bricklayer, 25½ days	95.63
	<u>\$243.63</u>

Total chargeable to the appropriations

Manufactured material:

Sand, 52 cubic yards, at \$2.33½	121.33
Crushed stone, 50 cubic yards, at \$2.61½	130.67
Brick, M. Hs. 11,000, at \$14.67	161.37
	<u>413.37</u>

Prison labor:

Labor excavating, 550½ days	275.25
Concrete work, 691 days	345.50
Carpenter helper, 6 days	3.00
Brickwork, 51 days	25.50
Blacksmith, 3 days	1.50
Plumbers, 5½ days	2.75
	<u>653.50</u>

Total cost this year

Previously reported

Total cost to date

SHOPS, WAGON SHED, AND STABLE REPAIRS.

Material chargeable to the appropriations:

Roofing	\$17.60
Miscellaneous	6.10
Cement	6.90
	<u>30.60</u>
Total	30.60
Hired force account: Bricklayer, 6 days, at \$3.75	22.50

Total chargeable to the appropriations

Manufactured material: Brick, 1,500, at \$14.67

Cost of prison labor:	
Bricklayers, 34 days (chimneys)	17.00
Carpenters, 2½ days	1.25
Plumbers, 10 days	5.00
	<u>23.25</u>
Total cost	<u>98.60</u>

WORK ON RAILROAD RIGHT OF WAY.

Material chargeable to the appropriations:

Plow	\$19.35
Plowshares	7.50
Spikes	13.00
Tools	2.32
	<u>42.17</u>

Total chargeable to the appropriations

Cost of prison labor: Grubbing stumps, 29 days

Total cost	<u>56.67</u>
Previously reported	<u>3,410.47</u>
Total cost to date	<u>3,467.14</u>

REPAIRS TO SCOWS, HOUSE BOAT, AND NINTH STREET WHARF.

Material chargeable to the appropriations: Miscellaneous	\$17.68
Force account chargeable to the appropriations: Carpenters, 20 days, on scows	80.00
Total chargeable to the appropriations	\$97.68
Cost of prison labor: Carpenters, 25½ days	12.75
Total cost	110.43

WORK ON RAILROAD CULVERT IN STONE QUARRY.

(See Workhouse report.)

Material chargeable to the appropriations: Cement	\$232.35
Force account (<i>see</i> Workhouse report).	
Manufactured material:	
Brick, 50,000, at \$14.67	\$733.50
Sand, 33 cubic yards, at \$2.33½	77.00
	810.50
Cost of prison (<i>see</i> Workhouse report).	
Total cost this year	1,042.85
Reported last year	266.33
Total (<i>see</i> Workhouse report)	1,309.18

POLLOCK HOUSE.

Material chargeable to the appropriations:

Slate and nails	\$257.46
Electrical	2.18
Weather strips	10.20
Miscellaneous material	13.39
Sheet iron	19.56
Slaters' cement	9.30
Paint	15.39
	327.48

Force account chargeable to the appropriation: Carpenters, 23 days

92.00

Total chargeable to the appropriations	419.48
No manufactured material used.	
Cost of prison labor:	
Carpenters, 20 days	\$10.00
Painters, 35½ days	17.75
	27.75
Total cost	447.23

REPAIRS TO WAGON ROADS.

Chargeable to the appropriations: One paid foreman, 1

day	\$3.75
Cost of prison labor: Labor, 589½ days	294.75
	298.50

FOOTBRIDGE BETWEEN ASSISTANT SUPERINTENDENT'S RESIDENCE AND
OFFICERS' HOUSE NO. 1.

Material chargeable to the appropriations:

Lime, 1 barrel	\$1.60
Nails, 600 pounds	28.34
	29.94
Lumber sawed on reservation: 1,485 board feet, at \$20	29.70
Cost of prison labor: Carpenters and helpers, 100 days	50.00
Total cost of footbridge	109.64

CHANGE IN HEATING TUNNEL.

Material chargeable to the appropriations: Cement and miscellaneous material	\$18.00
Cost of prison labor, 17 days	8.50
Total cost	26.50

PHYSICIAN'S RESIDENCE.

Material chargeable to the appropriations:	
Tools	\$19.90
Cement	209.30
Lime	2.40
Flooring	153.00
Lumber	85.20
Miscellaneous	75.63
	545.43
Labor chargeable to the appropriations:	
Carpenters, 25 days	100.00
Plumber, 12 days	60.00
Foreman, 31 days	155.00
Bricklayer, 63½ days	254.00
	569.00
Total chargeable to the appropriations	1,114.43

Manufactured material:	
Brick, 20,000, at \$14.67	293.40
Sand, 38 cubic yards, at \$2.33½	88.67
	382.07
Cost of prison labor:	
Carpenters, 20 days	10.00
Common labor, 397½ days	198.75
Brickwork, 400½ days	200.25
	409.00
Total cost	1,905.50

REPAIRS TO SAWMILL.

Material chargeable to the appropriations:	
Tools	\$0.28
Saw	19.50
Axes	17.40
Repairs to engine	80.61
Miscellaneous	2.29
	120.08
No hired force account.	
Total chargeable to the appropriations	120.08
No manufactured material.	
Cost of prison labor:	
Carpenter, 1 day	0.50
Blacksmith, 1½ days	.75
Plumber, 2 days	1.00
	2.25
Total cost	122.33

BUILDING STONE GATE POSTS AT ENTRANCE TO THE INSTITUTION.

Material chargeable to the appropriations: Cement	2.30
Cost of prison labor: Bricklayer, 9 days	4.50
Total cost	6.80

WAGON ROAD TO SITE OF PERMANENT BUILDINGS.

Material chargeable to the appropriations: Tools	\$29.80
Force account chargeable to the appropriations: Foreman, 41 days	164.00
Total chargeable to the appropriations	\$193.80
No manufactured material used.	
Cost of prison labor: Excavating, 421½ days	210.75
Total cost	404.55

PERMANENT BUILDING SITE.

Prison labor, grubbing, 217½ days	108.75

HOUSES ON 10A LOT JUST ACQUIRED.

Material chargeable to the appropriations:	
Nails	7.05
Roofing	15.40
	22.45
Hired force account chargeable to the appropriations: Carpenters, 5 days	20.00
Total chargeable to the appropriations	42.45
Native lumber used not reported.	
Cost of prison labor: Carpenters, 10½ days	5.25
Total cost	47.70

EXPENSES OF THE CONSTRUCTING ENGINEER'S OFFICE.

(See workhouse report.)

Material chargeable to the appropriations:	
Gasoline and oil for Ford truck	70.12
Repairs for Ford truck	5.90
Miscellaneous material	7.04
Total	83.06

MISCELLANEOUS REPAIRS BY PLUMBING SHOP.

Material chargeable to the appropriations:	
Tools	\$0.74
Material	297.46
Total chargeable to the appropriations	298.20
Cost of prison labor: Plumbers, 366½ days	183.25
Total cost	481.45

REPAIR WORK, GENERAL PAINTING.

Material chargeable to the appropriations:	
Paint, etc	\$225.29
Tools	1.81
Glass	26.90
Total chargeable to the appropriations	254.00
Cost of prison labor: Painters, 309½ days	154.75
Total cost	408.75

REPAIR AND GENERAL ELECTRICAL WORK.

(See workhouse report.)

Material chargeable to the appropriations:

Tools	\$17. 40
Electrical material	361. 21

Road lights.

Cement	4. 60
Miscellaneous	52. 12
Capt. Pettit's telephone installation	19. 99
	—————
Cost of prison labor: Electrician	\$455. 32
	21. 00
Total cost	476. 32

For labor on road lights, telephone, etc., see workhouse report.

REPAIR WORK, CARPENTER SHOP.

Material chargeable to the appropriation:

Tools	\$5. 30
Electric lamps	. 92
Miscellaneous	14. 72
Roofing (barber shop)	35. 20
Officers' quarters	9. 00
Chicken house	. 44
Hog pens	1. 83
Dog kennels	1. 85
Slater's tools	38. 40
Shed for dump cars. (See Workhouse report.)	
Roofing	19. 80
Miscellaneous	1. 51
	—————
Total cost	128. 97

Force account chargeable to the appropriations:

Carpenters (on general repairs) 4 days	16. 00
Remodeling old rest hall, 12 days	48. 00
	—————
Total cost	64. 00

Total chargeable to the appropriations	192. 97
No manufactured material reported.	

Cost of prison labor:

Carpenters (on hog pens), 14½ days	7. 25
Carpenters (on palut shop), 26½ days	13. 25
Carpenters (on general repairs), 397 days	198. 50
	—————
Total cost	219. 00

Total cost	411. 97
------------	---------

REPAIR WORK BY BLACKSMITH.

Material chargeable to the appropriations:

Iron	\$9. 68
Tools	1. 13
Paint	13. 14
Miscellaneous material	95. 94

Total chargeable to the appropriations	119. 89
Cost of prison labor: Helpers, 926 days	463. 00
	—————
Total cost	582. 89

REPAIRS TO PUMPING STATION.

(See workhouse report.)

Material chargeable to the appropriations:

Plumbing material	\$13.50
Fire brick	9.00
Electrical	1.73
Miscellaneous	.65
	\$24.88
Appropriation for permanent construction, buildings etc., 1917	45,000.00
Appropriation for permanent construction, buildings etc., 1918	45,000.00
Appropriation for permanent construction, buildings, etc., 1919	35,000.00
Appropriation for temporary quarters, furniture, and equipment	5,000.00
Expended from appropriation for maintenance for paint, lumber pumping supplies, etc., 1917	2,149.89
Expended from appropriation for maintenance for paint, lumber, etc., 1918-1919	1,129.57
Total	133,279.46

Chargeable against the above appropriations:

Previously reported, actual cost of work done	67,948.58
Rest hall, officers' quarters, and hospital	134.84
Main building and bakery	846.98
Punishment cells	1,365.54
Totten house	368.59
Boiler house—	
Brick chimney	1,846.40
Institution second boiler	339.01
Repairs—	66.50
Officers' residence No. 1	2,554.58
Work on superintendent's residence	553.75
Power line	1,219.30
Cottage for tubercular patients	2.45
Main sewer and septic tank	521.98
Shops and wagon shed repairs	53.10
Work on railroad right of way	42.17
Repairs to scows, houseboat, etc.	97.68
Railroad culvert in stone quarry	232.35
Pollock house	419.48
Road repairs	3.75
Foot bridge	29.94
Changes in heating tunnel	18.00
Physician's residence	1,114.43
Repairs to sawmill	120.08
Stone gate posts	2.30
Wagon road to permanent site	193.80
House on 10A lot	42.45
Expenses of constructing engineer's office	83.06
Repairs by plumbing shop	298.20
General painting	254.00
General electrical work	455.32
Repair work by carpenter shop	192.97
Blacksmith work	119.89
Repairs to pumping station	24.88
Salary of constructing engineer	1,800.00
Salary of assistant constructing engineer	300.25
Skilled laborers	717.87
Actual cost of work done	84,384.47
Material left on hand in commissary	2,692.57
Salaries, furniture, oils, etc., reported last year as not actual part of construction cost	9,577.75
Oils	81.00
Repairs, not included in report	213.85

Telephone tolls	\$0.60
Miscellaneous	10.00
Salaries, not included in actual cost of work	2,460.57
Total chargeable against appropriations	99,420.81
	=====
Total appropriations	133,270.46
Actually spent	99,420.81
Remainder of applications	33,858.65

COLD-STORAGE PLANT IN THE COMMISSARY.

No work done this year to be chargeable against this appropriation. Balance unexpended remaining as reported last year, \$342.23.

This balance is less than shown on the chief clerk's books, as this report charges against this appropriation wages paid mechanics for work actually done, while, as a matter of fact, the mechanics' wages were paid from some other appropriation.

ENLARGEMENT OF THE CENTRAL POWER PLANT.

(See report for District of Columbia workhouse.)

Material chargeable to the appropriations:

Cement	\$136.19
Tools	3.01
Paint	16.17
Lime	18.00
Lumber	533.16
Hardware	8.85
Glass	102.41
Feed-water heater	793.00
Roofing	186.04
Electrical lamps	1.10
Miscellaneous	99.59
Slate and nails	673.80
Ice plant—	
Iron	64.40
Miscellaneous	17.09
Cement	6.65
	2,659.46

Force account chargeable to the appropriations: Carpenters, 148½ days

594.00

Total chargeable to the appropriations

3,253.46

Manufactured material used: Lumber, 12,000 feet, at \$20

240.00

Cost of prison labor: Carpenters, 58½ days

29.25

=====

3,522.71

Total cost this year

=====

Total chargeable to the appropriation this year

3,253.46

Previously reported

33,999.83

Total chargeable to the appropriation to date

37,253.29

Total appropriation

63,000.00

Unexpended

25,746.71

Chief clerk's books gives unexpended as

27,995.14

Difference paid from other appropriation

2,248.43

DISTRICT OF COLUMBIA WORKHOUSE.

Silos.

Material chargeable to the appropriations:

Cement (foundations for ensilage cutter)	\$16.50
Steel channel	52.00
Lumber	187.50

256.00

Force account chargeable to the appropriations:	
Cement worker, 2½ days	\$10.00
Carpenters, 7½ days	30.00
	<u>\$40.00</u>
Total chargeable to the appropriations	296.00
Manufactured material:	
Sand, 5 cubic yards, at \$1.67	8.35
Stone, 6 cubic yards, at \$1.95	11.70
	<u>20.05</u>
Cost of prison labor:	
Cement work, 29 days	14.50
Carpenters, 29 days	14.50
	<u>29.00</u>
Total cost this year	345.05
Reported last year	2,950.57
Total cost of silos	<u>3,295.62</u>

SUPERINTENDENT'S RESIDENCE.

(See reformatory report.)

Material chargeable to the appropriations:	
Electrical	\$160.33
Wall paper	241.90
Lumber	69.75
Roofing, felt	68.20
Slate and nails	473.60
Paint	231.97
Glass	2.11
Plumbing	91.64
Cement	13.45
Miscellaneous	50.55
Tools	4.06
Screens, doors, etc.	157.58
Molding	18.12
	<u>1,583.24</u>
Force account chargeable to the appropriations:	
Carpenters, 48½ days	194.00
Carpenters, 50½ days, at \$2.33½	117.83
Bricklayer and plasterer, 3 days, at \$4	12.50
	<u>323.83</u>
Total chargeable to the appropriations	<u>1,907.07</u>
Manufactured material:	
Lumber, 1,200 board feet, at \$20	24.00
Brick, 5,200, at \$13.33½ (\$12 cost brick, \$1.335 hauling)	69.33
Sand, 13 cubic yards, at \$1.67 (sand \$1, hauling \$0.67)	21.71
Stone, 2 cubic yards, at \$1.95 (stone \$1.28, hauling \$0.67)	3.90
	<u>118.94</u>
Cost of prison labor:	
Plumbing, 80½ days	40.25
Painting, 270 days	135.00
Plastering, 8 days	4.00
Brickwork, 65 days	32.50
Blacksmith, ¼ day	.25
Electrical, 9½ days	4.75
Paper hanging, 10 days	5.00
Carpenters, 235½ days	117.75
	<u>339.50</u>
Total cost	<u>2,365.51</u>

ASSISTANT SUPERINTENDENT'S RESIDENCE.

Material chargeable to the appropriations:

Electrical	\$23.85
Paint	167.26
Wall paper	125.00
Nails	3.22
Pump	9.00
Range	56.35
Fly screen	30.40
Roofing	11.00
Plumbing	12.17
Miscellaneous	66.36
Lumber	167.60
	<u>\$672.21</u>

Force account chargeable to the appropriations:

Bricklayer, 3½ days, at \$4	14.00
Plastering, 10 days, at \$4	40.00
Carpenters—	
14½ days, at \$4	58.00
40 days, at \$2.25	90.00
	<u>202.00</u>

Total chargeable to the appropriations 874.21

Manufactured material:

Lumber, 1,200 feet, at \$20	24.00
Sand, 26 cubic yards, at \$1.67	43.42
Brick, 1,000, at \$13.33½	13.33
	<u>80.75</u>

Cost of prison labor:

Brickwork, 18 days	9.00
Blacksmith, ½ day	.25
Electrical, 18½ days	9.25
Plumbing, 34½ days	17.25
Painting, 185 days	92.50
Plastering, 68 days	34.00
Carpenters, 145 days	72.50
	<u>233.75</u>

Total cost 1,188.71

POLLOCK HOUSE.

(See reformatory report.)

Material chargeable to the appropriations:

Electrical	\$3.66
Cement	3.00
Wall paper contract	75.00
	<u>81.66</u>

Force account chargeable to the appropriations: Cement worker,
2½ days

	10.00
	<u>10.00</u>

Total chargeable to the appropriations 91.66

Manufactured material, none used.

Cost of prison labor:

Gilding and sizing walls, 1½ days	\$0.75
Electrical, 2 days	1.00
Plumbing, 3½ days	1.75
Cement work, 20 days	10.00
	<u>13.50</u>

Total cost 105.16

FARMER'S COTTAGE.

Material chargeable to the appropriations:

Electrical	\$0.95
Lumber	67.10
Paint	11.50
Roofing	17.80
Plumbing	27.40
Cement	19.50
Miscellaneous	15.97

\$160.22

Force account chargeable to the appropriations:

Brickwork, 8 days	32.00
Carpenters, 16 days	64.00

96.00

Total chargeable to the appropriations

256.22

Manufactured material:

Brick, 5,000 at \$13.33	66.65
Lumber, 1,000 feet, at \$20	20.00
Sand, 4 cubic yards, at \$1.67	6.68

93.33

Cost of prison labor:

Brickwork, 72 days	36.00
Carpenters, 55½ days	27.75
Electrician, 2½ days	1.75
Painters, 6½ days	3.25
Plumbers, 10 days	5.00

73.75

Total cost

423.30

WORK AT THE FEMALE DEPARTMENT.

Material chargeable to the appropriations:

Electrical	\$29.39
Cement	210.00
Roofing	6.16
Paint	15.10
Motor, laundry	65.00
Fly screen	85.23
Plumbing	15.00
Miscellaneous	24.36
Lime	36.00

486.24

Force account chargeable to the appropriations:

Carpenters	
32 days, at \$2.25	72.00
18 days, at \$4	72.00
Bricklayers, 43 days, at \$4	172.00

316.00

Total chargeable to the appropriations

802.24

Manufactured material:

Sand, 52 cubic yards, at \$1.67	86.84
Brick, 58,200, at \$13.33	776.00
Stone, 7 cubic yards, at \$1.95	13.65
Lumber, 2,000 feet, at \$20	40.00

916.49

Cost of prison labor:

Carpenters, 134 days	67.00
Electricians, 11 days	5.50
Painting, 6½ days	3.25
Plumbing, 95½ days	47.75
Brickwork, 328 days	164.00

287.50

Total cost

2,006.23

REPAIR WORK AT THE DAIRY.

Material chargeable to the appropriations:	
Reinforcing steel for new floor	\$79.87
Cement and lime	23.30
Miscellaneous material	27.14
Electrical	.84
Plumbing	57.49
Screens, fly	23.20

	\$211.84
Force account chargeable to the appropriations:	
Cement worker, 4 days, at \$4	16.00
Carpenters—	
11 days at \$4	44.00
7 days, at \$2.33 $\frac{1}{2}$	16.33

	76.33
Total chargeable to the appropriations	288.17
Manufactured material:	
Lumber, 2,000 feet, at \$20	40.00
Sand, 10 cubic yards, at \$1.67	16.70
Stone, 20 cubic yards, at \$1.95	39.00

	95.70
Cost of prison labor:	
Electricians, 7 $\frac{1}{2}$ days	3.75
Cement workers, 17 $\frac{1}{2}$ days	8.75
Plumbers, 15 days	7.50
Painters, 1 day	0.50
Carpenters, 116 days	58.00

	78.50
Total cost (not including the entire cost of replacing the old concrete floor which failed as this work was not completed until after July 1, 1919)	462.37

WORK ON OLD ICE PLANT.

Material chargeable to the appropriations:	
Roofing	\$22.00
Plumbing	17.77
Electrical	30.74
Miscellaneous	26.62

	97.13
Force account chargeable to the appropriations: Carpenter, 1 day	4.00

Total chargeable to the appropriations	101.13
No manufactured material used.	
Cost of prison labor:	
Carpenters, 5 days	2.50
Plumbers, 11 $\frac{1}{2}$ days	5.75
Electricians, 2 $\frac{1}{2}$ days	1.25

	9.50
Total cost	110.63

WORK AT THE HOG PENS.

Material chargeable to the appropriations:	
Equipment	\$63.05
Lime	25.15
Roofing	94.64
Miscellaneous	30.93

	213.77

Force account chargeable to the appropriations:

Carpenters, 16 days, at \$4-----	\$64.00
Bricklayers, 23½ days, at \$4-----	94.00
	\$158.00

Total chargeable to the appropriations----- 371.77

Manufactured material:

Sand, 31 cubic yards, at \$1.67-----	51.77
Stone, 10 cubic yards, at \$1.95-----	19.50
Lumber, 12,000 feet, at \$20-----	240.00
Brick, 20,000, at \$13.33½-----	266.67

577.94

Cost of prison labor:

Carpenters, 139½ days-----	69.75
Cement and brickwork, 213 days-----	106.75
Excavating, 218½ days-----	109.25
Plumber, 29 days-----	14.50
Painting, ½ day-----	.25
Blacksmith, 2 days-----	1.00

301.25

Total cost----- 1,250.96

REPAIRS TO SCOWS, HOUSE BOAT, TUGS, ETC.

Material chargeable to the appropriations:

Lumber-----	\$201.29
Paint-----	8.50
Miscellaneous-----	25.57
	235.36

Tug *Louise*:

Paint-----	55.71
General overhauling-----	477.81
	533.52

Tug *General Warren*:

Chain used to raise <i>General Warren</i> -----	27.50
Miscellaneous-----	1.24
	28.74

Total cost of bought material----- 797.62

Force account chargeable to the appropriations:

Carpenters-----	
1 day, at \$4-----	4.00
7 days, at \$2.33½-----	16.00
	20.00
Total-----	817.62

Total chargeable to the appropriations----- 80.00
Manufactured material—Lumber, 4,000 feet, at \$20----- 12.25
Cost of prison labor—Carpenters, 24½ days-----

Total cost----- 909.87

PRISONERS' KITCHEN AND DINING ROOM.

Material chargeable to the appropriations:

Paint-----	\$119.18
Electrical-----	11.94
Miscellaneous-----	11.61
	142.73

Total chargeable to the appropriations----- 142.73
Manufactured material:

Sand, 3 cubic yards, at \$1.67-----	5.01
Lumber, 300 feet, at \$20-----	6.00

OPERATIONS OF THE ENGINEER DEPARTMENT.

145

Cost of prison labor:

Carpenters, 12½ days	\$6.25
Cement work, 2 days	1.00
Blacksmith, ¼ day	.25
Painters, 94½ days	47.25
Plumbers, 8½ days	4.25
	<hr/>
	\$59.00
Total cost	<hr/> <hr/> 212.74

REPAIRS TO SAWMILL.

Material chargeable to the appropriations:

Saw	\$3.18
Tools	5.25
Miscellaneous	35.83
	<hr/>
Total cost	<hr/> <hr/> 44.26

REPAIR WORK AT BRICK YARD.

Material chargeable to the appropriations:

Cement	\$14.35
Roofing	20.24
Repairs to dry pan	53.85
Rope	20.50
Electrical	53.79
Plumbing	111.53
General repairs	376.70
Tools	6.84
Miscellaneous	97.56
	<hr/>
	755.36

Material (manufactured):

Sand, 5 cubic yards, at \$1.67	8.35
Lumber, 2,000 feet, at \$20	40.00
	<hr/>
Total cost as reported	48.35

Cost of prison labor:

Electricians, 27 days	13.50
Blacksmith, 1 day	.50
Plumbers, 20 days	10.00
	<hr/>
Total cost as reported	24.00

Most of the work was done by the regular brick plant gang
and so was not reported.

Total cost as reported	<hr/> <hr/> 827.71
------------------------	--------------------

REPAIR WORK AT POULTRY YARDS.

Material chargeable to the apprpriations:

Roofing	\$75.74
Cement	92.00
Paint	16.95
Electrical	1.75
Miscellaneous	26.92
	<hr/>
	213.36

Force account chargeable to the appropriations:

Carpenters, 2 days, at \$4	\$.00
Cement worker, 7½ days, at \$4	30.00
	<hr/>
Total cost as reported	38.00

Manufactured material chargeable to the appropriations:

Sand, 59 cubic yards, at \$1.67	98.53
Stone, 28 cubic yards, at \$1.95	54.60
	<hr/>
Total cost as reported	153.13

Cost of prison labor:	
Carpenters, 17 days	\$8.50
Bricklayers, 72 days	36.00
Plumbers, 3½ days	1.75
Electricians, 2 days	1.00
Painters, 7 days	3.50

Total cost	\$50.75

	455.24

REPAIR WORK AT THE BOILER HOUSE.

Material chargeable to the appropriations:

Cement	\$107.25
Electrical	1.30
Miscellaneous	9.11

117.66

Force account chargeable to the appropriations:

Cement worker, 4 days, at \$4	16.00
Dismantling boiler for District of Columbia Reformatory	8.00
Carpenters, 4 days, at \$4	16.00

	40.00

Total chargeable to the appropriations

157.66

Manufactured material:

Sand, 6 cubic yards, at \$1.67	10.02
Stone, 6 cubic yards, at \$0.195	11.70

21.72

Cost of prison labor:

Plumbers and steam fitters, 25 days	12.50
Cement workers, 52 days	26.00
Bricklayers, 4 days	2.00
Electricians, ½ day	.25
Carpenters, 12 days	6.00
Removing boiler to District of Columbia Reformatory, 69 days	34.50

	81.50

Total cost

260.88

NEW CHIMNEY AT THE BOILER HOUSE.

Chargeable to the appropriations:

Contract price of chimney	\$1,630.00
Cement	94.30
Miscellaneous material	1.15
Carpenter on foundation of forms	10.00
Excavating and concrete work, foreman, 32½ days	16.50

1,751.95

To be credited for cement used by the contractor	71.50

1,680.45

Actual cost of stack

Manufactured material:	
Sand, 17 cubic yards, at \$1.67	28.39
Stone, 20 cubic yards, at \$1.95	39.00
	67.39

Cost of prison labor—Excavating and concrete work, 264 days	132.00

132.00

Total cost

2,022.84

ENLARGEMENT CENTRAL POWER PLANT.

(See reformatory report.)

Material chargeable to the appropriations:

Roofing	\$209.00
Electrical	2.80
Paint	1.06
Tools	1.19
Miscellaneous	32.29
	<u>\$246.34</u>

Force account chargeable to the appropriations:

Bricklayers, 31 days	124.00
Carpenters, 106½ days	426.00
	<u>550.00</u>

Total chargeable to the appropriations

Manufactured material: Reported in the reformatory report.

Cost of prison labor:

Bricklayers, 3 days	1.50
Cement workers, 212 days	106.00
Carpenters, 616 days	308.00
Painters and glaziers, 20½ days	10.25
Blacksmith, 3 days	1.50
	<u>427.25</u>

Grading in front of central power plant: Prison labor, 427 days

Total cost to workhouse	<u>213.50</u>
-------------------------	---------------

WORK ON THE CALF SHEDS.

Material chargeable to the appropriations: Roofing

88.50

Force account chargeable to the appropriations: Carpenters, 2 days,
at \$4

8.00

Total chargeable to the appropriations

96.00

No manufactured material used.

Cost of prison labor: Carpenters, 10 days

5.00

Total cost	<u>101.00</u>
------------	---------------

REPAIR WORK ON THE DAWSON HOUSE.

Material chargeable to the appropriations:

Cement	\$5.85
Lumber	<u>46.50</u>
	<u>52.35</u>

Force account chargeable to the appropriations: Carpenters, 3 days

12.00

Total chargeable to the appropriations

64.35

Manufactured material:

Sand, 3 cubic yards, at \$1.67	5.01
Stone, 2 cubic yards, at \$1.95	<u>3.90</u>
	<u>8.91</u>

Cost of prison labor: Carpenters, 6 days

3.00

Total cost	<u>76.26</u>
------------	--------------

REPAIRS TO THE STONE CRUSHER.

Material chargeable to the appropriations:

Stone screen	\$15.02
Miscellaneous	<u>3.76</u>
	<u>18.78</u>

Work done by the regular stone-crusher gang so the force account
was not reported.

WORK DONE AT THE MESS HALL ON LOWER SITE.

Material chargeable to the appropriations:

Lime	\$5.25
Plumbing	9.79
Fly screen	3.68
Miscellaneous	1.13
	819.85

Force account chargeable to the appropriations:

Carpenters, 24 days, at \$4	96.00
Bricklayers, 42 days, \$4	168.00
	264.00

Total chargeable to the appropriations----- 283.85

Manufactured material:

Brick, 2,000, at \$13.33½	26.67
Sand, 1 cubic yard, \$1.67	1.67
Lumber, 2,000 feet, at \$20	40.00
	68.34

Cost of prison labor:

Carpenters, 8 days	4.00
Bricklayers, 4 days	2.00
	6.00

Total cost----- 358.19

REPAIRS TO PUMPING STATION.

(See District of Columbia Reformatory report.)

Material chargeable to the appropriations:

Pump rods	\$50.70
Miscellaneous material	80.65
Total cost	131.35

All labor was done by the regular pump house force and so was not reported.

REPAIR WORK ON THE HOSPITAL.

Material chargeable to the appropriations:

Roofing	\$92.40
Electrical	2.65
Paint	19.40
Miscellaneous	3.98
Fly screens	19.80
	138.23

Force account chargeable to the appropriations: Carpenters, 15 days----- 60.00

Total chargeable to the appropriations----- 198.23

No manufactured material used.

Cost of prison labor:

Carpenters, 60 days	30.00
Plumbers, 5 days	2.50
Painters, 2½ days	1.25
	33.75

Total cost----- 231.98

REPAIR WORK TO OFFICERS' QUARTERS.

Material chargeable to the appropriations:

Cement	\$83.45
Fly screen	9.24
Lime	18.00
Plumbing	1.00
Miscellaneous	1.80
	113.49

Force account chargeable to the appropriations:

Bricklayer, 10 days, at \$4	\$40.00
Carpenters, 1 day, at \$4	4.00
	<u><u>\$44.00</u></u>

Total chargeable to the appropriations

157.49

Manufactured material:

Sand, 21 cubic yards, at \$1.67	35.07
Brick, 20,500, at \$13.33 $\frac{1}{2}$	273.33
	<u><u>308.40</u></u>

Cost of prison labor:

Plumbers, 2 $\frac{1}{2}$ days	1.25
Electricians, 1 day	.50
Bricklayers, 95 days	47.50
Painters, 4 $\frac{1}{2}$ days	2.25
Carpenters, 4 $\frac{1}{2}$ days	2.25
	<u><u>53.75</u></u>
Total cost	<u><u>519.64</u></u>

REPAIR WORK ON THE REST HALL.

Material chargeable to the appropriations:

Cement	\$58.50
Lime	3.80
Paint	29.00
Miscellaneous	7.43
	<u><u>98.73</u></u>

Force account chargeable to the appropriations:

Bricklayers, 9 days, at \$4	36.00
Carpenters, 3 days, at \$4	12.00
Carpenters, 4 days, at \$2.33	9.32
	<u><u>57.32</u></u>
Total chargeable to the appropriations	<u><u>156.05</u></u>

Manufactured material:

Sand, 4 cubic yards, at \$1.67	6.68
Brick, 14,000, at \$13.33 $\frac{1}{2}$	186.67
	<u><u>193.35</u></u>
Total	<u><u>434.15</u></u>

SLAUGHTERHOUSE.

Material chargeable to the appropriations:

Cement	\$11.50
Miscellaneous	1.35
	<u><u></u></u>

No labor chargeable to the appropriations.

Total chargeable to the appropriations

12.85

Manufactured material:

Brick, 2,400, at \$13.33 $\frac{1}{2}$	32.00
Lumber, 1,500 feet, at \$20	30.00
	<u><u>62.00</u></u>

Cost of prison labor:

Bricklayers, 10 days	5.00
Laborers, 20 days	10.00
	<u><u>15.00</u></u>
Total cost	<u><u>89.85</u></u>

REPAIRS ON A, B, C, QUARTERS.

Material chargeable to the appropriations:

Lime	\$40.65
Paint	68.25
Cement	23.00
Fly screen	10.80
Electrical	29.49
Miscellaneous	2.07
	\$174.26

Force account chargeable to the appropriations:

Bricklayers, 8 days, at \$4	32.00
Carpenters, 2 days, at \$2.33	4.66
	30.66

Total chargeable to the appropriations----- 210.92

Manufactured material:

Brick, 22,300, at \$13.33	297.33
Sand, 8 cubic yards, at \$1.67	13.36
	310.69

Cost of prison labor:

Plumbers, 7 days	3.50
Bricklayers, 90 days	45.00
Electrician, $\frac{1}{2}$ day	.25
Painter, 1 day	.50
Carpenters, 10 days	5.00
	54.25

Total cost----- 575.86

REPAIRS AT NINTH STREET YARD AND WHARF.

Material chargeable to the appropriations:

Roofing	\$9.90
Paint	17.60
Tools	.20
Electrical	2.30
Range	12.50
Miscellaneous	21.76

Total chargeable to the appropriations----- 64.26
Manufactured material: Brick, 1,800, at \$13.33----- 24.00

Cost of prison labor:

Electricians, $\frac{1}{2}$ days	\$2.25
Blacksmith, $2\frac{1}{2}$ days	1.25
Painters, $\frac{1}{2}$ day	.25
	3.75

Total cost of repairs----- 92.01

WORK ON CULVERT ALONG TELEGRAPH ROAD.

Material chargeable to the appropriations:

Tools	\$4.78
Cement	161.00
Lime	54.00
	219.78

Force account chargeable to the appropriations: Bricklayer
26 days----- 104.00

Total chargeable to the appropriations----- 323.78

Manufactured material:

Brick, 50,000, at \$13.33	\$666.67
Sand, 20 cubic yards, at \$1.67	33.40

Cost of prison labor: On brickwork and excavating, 235 days----- 117.50

Total cost----- 1,141.35

FENCE ALONG ROAD TO WHARF.

Material chargeable to the appropriations: Nails, etc-----	\$4.51
Force account chargeable to the appropriations: Car-	
penters-----	
7 days, at \$2.33-----	\$16.31
2 days, at \$4-----	8.00

Total chargeable to the appropriations-----	28.82
Manufactured material: Lumber, 3,000 feet, at \$20-----	60.00
Cost of prison labor: Carpenters' helpers and post-hole	
diggers, 115 days-----	57.50

Total cost-----	146.32

SHED OVER DUMP CARS FOR RAILROAD.

Material chargeable to the appropriations:	
Roofing-----	\$44.00
Nails-----	8.00

Total chargeable to the appropriations-----	52.00
Manufactured material: Lumber, 3,500 feet, at \$20-----	70.00
Prison labor: Carpenters, 50 days-----	25.00

Total cost-----	147.00

REPAIRS TO AND ALTERATIONS IN THE ADMINISTRATION BUILDING.

Material chargeable to the appropriations:	
Flooring-----	\$27.50
Lumber-----	100.00
Plumbing-----	6.82
Electrical-----	4.88
Miscellaneous-----	12.33
Nails-----	8.30

	159.83
Force account chargeable to the appropriations:	
Carpenters, 42 days-----	168.00
Bricklayers, 1½ days-----	6.00

Total chargeable to the appropriations-----	174.00
Manufactured material:	
Lumber, 3,000 cubic feet, at \$20-----	60.00
Sand, 2 cubic yards, at \$1.67-----	3.34

	63.34
Cost of prison labor:	
Carpenters, 110½ days-----	55.25
Blacksmith, 1 day-----	.50
Painters, 9 days-----	4.50
Plumbers, 8 days-----	4.00
Bricklayers, 6 days-----	3.00

	67.25
Total cost-----	464.42

CULVERT IN QUARRY.

(See reformatory report.)

Material chargeable to the appropriations: Miscellaneous-----	.94
Force account chargeable to the appropriations:	
Carpenters, 2 days-----	\$8.00
Bricklayers, 30 days, at \$4-----	120.00

Total chargeable to the appropriations-----	128.00

Manufactured material: Sand, 25 cubic yards, at \$1.67-----	\$41.75
Cost of prison labor:	
Carpenters, 8 days-----	\$4.00
Bricklayers, 263 days-----	131.50
	135.50
Total cost-----	306.19

TUBERCULOSIS COTTAGE.

Material chargeable to the appropriations:	
Fly screen-----	\$25.34
Miscellaneous-----	3.33
	28.67
Force account chargeable to the appropriations (previously reported under female department): 19 days of carpenter work, at \$2.33-----	44.27

WORK AT THE COMMISSARY.

Material chargeable to the appropriations:	
Lumber-----	\$419.50
Beaver board-----	194.20
Miscellaneous-----	10.09
	623.79
Force account chargeable to the appropriations: Carpenters, 31 days, at \$4-----	124.00
Total chargeable to the appropriations-----	747.79
No manufactured material used.	
Cost of prison labor:	
Carpenters, 261½ days-----	\$130.75
Electricians, 2½ days-----	1.25
Plumbers, 2 days-----	1.00
Painters, 5 days-----	2.50
	135.50
Total cost-----	883.29

LARGE SIGNBOARD.

Material chargeable to the appropriations:	
Lumber-----	\$24.00
Paint-----	3.15
Electrical-----	4.92
Miscellaneous-----	1.35
	33.42
Force account chargeable to the appropriations: Carpenters, 7 days, at \$4-----	28.00
Total chargeable to the appropriations-----	61.42
No manufactured material used.	
Cost of prison labor:	
Carpenters, 24 days-----	\$12.00
Electrician, 10 days-----	5.00
Painters, 11 days-----	5.50
Plumbers, 4 days-----	2.00
	24.50
Total cost-----	85.92

STEAM TUNNEL FROM THE COMMISSARY TO THE DAIRY.

Material chargeable to the appropriations: Plumbing-----	\$3.52
Force account, 7½ days-----	30.00

Total chargeable to the appropriations-----	33.52
---	-------

Manufactured material:

Brick, 1,200, at 13.33½-----	\$16.00
Lumber, 500 feet, at \$20-----	10.00
Sand, 3 cubic yards, at \$1.67-----	5.01
Stone, 2 cubic yards, at \$1.95-----	3.90
-----	34.91

Cost of prison labor:

Excavating, 20 days-----	10.00
Bricklaying, 35 days-----	17.50
Plumbing, 20 days-----	10.00
-----	37.50
Total cost-----	105.93

RAILROAD.

(See reformatory report.)

Material chargeable to the appropriation:

Tools-----	\$6.58
Dynamite-----	40.30
Miscellaneous-----	80.76
-----	127.64

Total chargeable to the appropriations-----

No manufactured material used except railroad ties, which are to be reported later.

Cost of prison labor:

Grading and laying track, 2,544½ days-----	\$1,272.25
Painting-----	3.75
-----	1,276.00
Total cost-----	1,403.64

ICE PLANT AT THE CENTRAL POWER PLANT.

(See reformatory report.)

Material chargeable to the appropriations. See report for the reformatory.

Force account chargeable to the appropriations:

Carpenters, 26 days-----	\$104.00
Cement work, 14 days, at \$4-----	56.00
-----	160.00

For manufactured material see reformatory report.

Cost of prison labor:

Blacksmith, 1 day-----	\$0.50
Carpenters, 97 days-----	48.50
Helpers to contractor, 130 days-----	65.00
Excavating, 41 days-----	20.50
Cement workers, 97 days-----	48.50
Plasterers, 13 days-----	6.50
Plumbers, 19 days-----	9.50
Electricians, 3 days-----	1.50
-----	200.50
Total cost-----	360.50

STEAM TUNNEL FROM ICE PLANT TO STONE CRUSHER.

Material (reported with the reformatory).

Cost of prison labor:

Excavating, 452 days-----	\$226.00
Bricklayers, 176 days-----	88.00
-----	314.00

PHYSICIANS' RESIDENCE.

Material charged against the workhouse on the requisitions for manufactured material (see reformatory for all other costs):	
Brick, 25,000, at \$13.33½	\$333.33
Sand, 20 cubic yards, at \$1.67	33.40
Stone, 10 cubic yards, at \$1.95	19.50
	<hr/>
Cost of prison labor: Plumbing (roughing in), 6 days	3.00
Total cost	<hr/> 389.23

EXPENSES OF THE CONSTRUCTING ENGINEER'S OFFICE.

(See reformatory report.)

Material chargeable to the appropriations:

Tools	\$1.98
Gasoline and oil for Ford truck	23.75
Repair parts, tires, etc., for Ford truck	48.44
Miscellaneous	.91
	<hr/> 75.08

REPAIR WORK IN THE HORSE STABLE.

Material chargeable to the appropriations: Miscellaneous	17.24
Force account chargeable to the appropriations: Carpenters, 13 days, at \$4	52.00
Total chargeable to the appropriations	69.24
Manufactured material: Lumber, 5,000 feet, at \$20	110.00
Cost of prison labor:	
Carpenters, 62 days	\$31.00
Blacksmith, 1½ days	.75
Electrician, 2 days	1.00
Painters, 3½ days	1.75
Plumbers, 7½ days	3.75
	<hr/> 38.25
Total cost	<hr/> 217.49

WORK ON PERMANENT POWER LINE TO THE REFORMATORY.

(See reformatory report.)

Workhouse prison labor, 25 days	<hr/> 12.50
---------------------------------	-------------

REPAIR WORK ON WAGON ROAD.

Chargeable to the appropriations:	
Hired force, 14 days, at \$4	\$56.00
Prison labor, 947 days	473.50
	<hr/> 529.50

GENERAL BLACKSMITH WORK.

Material chargeable to the appropriations:	
Tools	\$26.86
Iron	73.23
Miscellaneous	334.90
	<hr/> 434.99
Total chargeable to the appropriations	434.99
No manufactured material used.	
Prison labor, 1,397 days	698.50
	<hr/> 1,133.49
Total chargeable to the appropriations	<hr/> 1,133.49

GENERAL ELECTRICAL WORK.

Material chargeable to the appropriations:

Tools	\$0.98
Repairs to motor for well at gate	15.90
Wire	99.80
Rewinding motor	86.00
Spike poles	10.80
Miscellaneous	245.45

Total chargeable to the appropriations	\$458.93
Cost of prison labor, 181½ days	90.75

Total cost	<u><u>549.68</u></u>
------------	----------------------

GENERAL PAINTING.

Material chargeable to the appropriations:

Paint	\$656.29
Tools	44.48
Glass	97.02
Linseed oil	170.00
Turpentine	58.00
	<u>1,025.79</u>
Prison labor, 450 days	225.00
	<u><u>1,250.79</u></u>

GENERAL PLUMBING AND STEAM FITTING.

Material chargeable to the appropriations:

Cement	\$1.95
Tools	8.38
Pipe fittings	419.90
Magnesia	42.50
Drain	29.34
Radiators	108.69
Miscellaneous	246.69
Lime	9.50
	<u>909.45</u>
Prison labor, 1,004 days	502.00
	<u><u>1,411.45</u></u>

MISCELLANEOUS WORK.

Chargeable to the appropriations:

Material used in the installation of road lights	34.17
Material used on wharf road	1.17
Material used on scales at wharf	7.28
Material used on hotbeds, glass	25.00
Miscellaneous material	6.48
Tools to cement worker	4.22
Machine shop—	
Oxygen	70.00
Tools	2.89
Quarry tools	4.50
Total	155.71

Force account chargeable to the appropriations:

Cement work at Dawson House, 1½ days	6.00
Paving sidewalk to hospital, 2 days	8.00

Total chargeable to the appropriations	169.71
Prison labor, 137 days	68.50

Total cost	<u><u>238.21</u></u>
------------	----------------------

GENERAL WORK BY THE CARPENTER SHOP.

Material chargeable to the appropriations:

Miscellaneous	\$99.47
Fly screen	9.00
Roofing	6.60
Tools	21.44

\$136.51

Force account chargeable to the appropriations: Carpenters, 45½ days, at \$4	182.00
--	--------

Total chargeable to the appropriations	318.51
--	--------

Manufactured material: Lumber, 1,500 feet, at \$20	30.00
Prison labor: 437½ days	218.75

Total cost	218.75
------------	--------

APPROPRIATION FOR FUEL, OILS, AND REPAIRS.

Manufacturing and construction, 1918	30,000.00
Addition to above because of high price of coal	12,000.00
Appropriation for material for repairs to buildings, etc.	4,000.00
Appropriation for dairy and forage building	4,000.00
Total appropriations	50,000.00

Chargeable against the above appropriations:

Silos	296.00
Superintendent's residence	1,907.07
Assistant superintendent's residence	874.21
"Pollock House"	91.66
Farmer's cottage	256.22
Work at the female department	802.24
Repair work at the dairy	288.17
Work on old ice plant	101.13
Work on the hog pens	371.77
Repairs to seows, house boat, tugs, etc	817.62
Prisoners' kitchen and dining room	142.73
Repairs to sawmill	44.26
Repair work at brickyard	755.36
Repair work at poultry yards	251.30
Repair work at boiler house	157.66
New chimney at boiler house	1,751.95
Enlargement to central power plant	796.34
Work on calf sheds	96.00
Repair work on the "Dawson House"	64.35
Repairs to stone crusher	18.78
Work done at mess hall on lower site	283.85
Repairs to pumping station	131.35
Repair work on hospital	198.23
Repair work to officers' quarters	157.49
Repair work on the rest hall	156.05
Work at the slaughterhouse	12.85
Repairs to A, B, and C quarters	210.92
Repairs at Ninth Street yard and wharf	64.26
Work on culvert along telegraph road	323.73
Fence along road to wharf	28.82
Shed over railroad dump cars	52.00
Repairs to and alterations in the administration building	333.83
Culvert in quarry	128.94
Tuberculosis cottage	28.67
Work at the commissary	747.79
Large sign boards	61.42
Steam tunnel from commissary to the dairy	33.52
Railroad	127.64
Ice plant at central power plant	160.00

OPERATIONS OF THE ENGINEER DEPARTMENT.

157

Chargeable against the above appropriations—Continued.

Expenses of constructing engineer's office	\$75.08
Repair work in horse stable	69.24
Repair work on wagon roads	529.50
General blacksmith work	434.99
General electrical work	458.93
General painting	1,025.79
General plumbing	909.45
Miscellaneous work	169.71
General work by the carpenter shop	318.51
 Total	 17,117.43
Spent for fuel, oil, wages, etc., plus material in the commissary (not included in the above)	32,601.10
 Total	 49,718.53
Unexpended	281.47

C. B. BACKUS,
*Constructing Engineer.*SNOWDEN ASHFORD,
Municipal Architect.

To Capt. CAREY H. BROWN.

REPORT OF THE INSPECTOR OF BUILDINGS.

WASHINGTON, July 31, 1919.

Sir: I submit herewith annual report covering the transactions of the building division during the fiscal year ended June 30, 1919.

No report of Federal Government operations has been received during the year.

Statement of permits issued from July 1, 1918, to June 30, 1919.

	Number.	Value.		Number.	Value.
Brick:			Concrete:		
Repairs	1,053	\$1,325,177	Apartments	2	\$1,000,000
Dwellings	413	2,062,950	Freight shed	1	160,000
Apartments	19	1,457,000	Warehouses	2	52,200
Stores and dwellings	2	8,000	Power house	1	62,000
Office buildings	6	284,800	Laboratory	1	8,000
Stores	11	119,980	Repairs	3	3,350
Warehouses	16	173,865	Office	1	600
Workshops	5	92,050	Shelter house	1	600
Hotel	1	200,000	Supply house	1	1,000
Church	1	45,000	Garages	45	33,220
Post office	1	8,000	Shed	1	25
Dairy	1	16,000			
Banks	2	120,000	Metal:		
Theater	1	50,800	Garages	858	164,321
Blacksmithy	1	4,000	Sheds	25	6,660
Service station	1	50,000	Frame:		
Reduction plant	1	10,000	Sheds	229	44,547
Garages	568	739,773	Repairs	315	100,273
Sheds	9	10,895	Dwellings	324	1,350,195
Stables	2	1,250	Garages	204	44,041
Substation	1	3,000	Stable	1	1,500
Hollow tile:			Office	1	150
Dwellings	11	70,100	Church	2	8,700
Garages	129	53,942	Stores	3	5,406
Drill hall	1	60,000	Boathouse	1	3,500
Shed	2	330	Elevators	59	194,529
Resthouse	1	10,000	Motors	618	207,620
Laundry	1	1,500	Boilers	63	23,378
Boiler house	1	3,770	Gas engines	2	4,250
Repairs	4	8,150	Total	5,032	10,508,291
Stone:			Awnings	89	6,075
Dwelling	1	15,000	Signs	590	5,900
Church	1	22,000	Grand total	5,711	10,520,866
Garage	1	900			

The following summary shows the distribution of improvements in the respective sections of the District and the values of same:

	Buildings.	Repairs, etc.
Northeast.....	\$241,680	\$113,159
Southeast.....	276,745	111,017
Northwest.....	2,899,437	1,312,260
Southwest.....	252,900	74,507
County.....	4,715,958	480,628
Total.....	8,385,720	2,121,571
Sum total ¹	2,121,571	
	10,508,291	

¹ Does not include awnings or signs, the values of which are estimated.

Grand total for all building operations, \$10,520,866.

Comparative statement for years 1918 and 1919.

	New buildings.	Repairs, etc.	Dwellings.	Apart- ments.	Business buildings.
1919.....	1,598	3,434	749	21	828
1918.....	957	2,610	529	9	419
	1 641	1 824	1 220	1 12	1 409

¹ Increase.

Valuation of building operations, including awnings and signs:

1919.....	\$10,520,866
1918.....	10,164,457
Increase.....	356,400

Permits issued, number of, including awnings and signs:

1919.....	4,948
1918.....	3,906
Increase.....	1,042

Projections beyond the building line, number for which permits issued:

1919.....	903
1918.....	1,102
Decrease.....	199

Estimated number of buildings in the District of Columbia.

	Brick.	Frame.
1919, erected.....	1,267	331
1919, razed.....	39	128
1918.....	1,228	203
Total estimated number standing.....	65,401	26,806
	66,629	27,000

Notwithstanding the high cost of labor and material there has been a very marked increase in building operations during the current year.

The expenses for the year exceeded the receipts of building fees by approximately \$7,600.

OPERATIONS OF THE ENGINEER DEPARTMENT.

159

Since the close of active war operations and the signing of the armistice several employees of this division who were in the military service with the A. E. F. have returned and been reinstated in this division.

JOHN P. HEALY,
Inspector of Buildings.

The ASSISTANT TO THE ENGINEER COMMISSIONER, *District of Columbia.*

REPORT OF INSPECTOR OF STEAM BOILERS.

WASHINGTON, D. C., October 6, 1919.

SIR: I have the honor to submit the following report for the fiscal year ended June 30, 1919, together with fees received and expenses incurred:

Boilers inspected	431
Boilers inspected for District of Columbia	35
Boilers inspected for United States	9
Boilers condemned as unfit for further use	8
Cases of scale and deposit	75
Cases of defective setting	35
Cases of defective steam gauges	21
Cases of defective tubes	34
Cases of defective shell plates	12
Total amount received	\$2,155
Total amount expended	\$820
Balance	\$1,835

Very respectfully,

E. F. VERMILLION,
Inspector of Steam Boilers.

To the INSPECTOR OF BUILDINGS.

REPORT OF BOARD OF EXAMINERS OF STEAM ENGINEERS.

WASHINGTON, D. C., August 15, 1919.

SIR: The board of examiners of steam engineers have the honor to submit to you the report for the year ending June 30, 1919.

The following table shows the work as it progressed during each month:

	Meetings held.	Applicants received.	Applicants approved.	Applicants incompetent.	First class.	Second class.	Third class.	Special class.	Duplicate.
1918.									
July.....	4	9	2	7			2		
August.....	5	19	8	11		1	5	2	
September.....	4	10	5	5			3		2
October.....	4	3	3		1		1		1
November.....	5	22	10	12	1		6	3	
December.....	4	6		6					
1919									
January.....	5	19	8	11	1		6	1	
February.....	4	3	3				3		
March.....	4	11	4	7			4		
April.....	4	8	2	6			2		
May.....	5	8	2	6	1		1		
June.....	4	11	2	9			2		
Total.....	52	129	49	80	4	1	35	6	3

In addition to examining applicants for steam engineer's license the board has also conducted the examination of applicants for automobile and motor cycle operators, a full report of which is being submitted by the secretary of the automobile board.

E. F. VERMILLION.
H. BOESCH, *Secretary.*
W. I. EVANS.

The INSPECTOR OF BUILDINGS.

REPORT OF INSPECTOR OF PLUMBING.

WASHINGTON, D. C., September 10, 1919.

SIR: I have the honor to make the thirty-seventh annual report of this plumbing inspection division, engineer department:

Preliminary examinations	6,750
Cast-iron sewers:	
New	2,937
Repairs	925
Terra-cotta sewers:	
New	56
Repairs	1,208
Main sewers tapped	822
Rough work in—	
New houses	1,373
Old houses	1,333
Water services	561
Notices served	190
Peppermint tests and final inspections	1,450
Work not ready for inspection when ordered	344
Changes ordered in work incorrectly installed	429
Special inspections of municipal work	437
Gas	1,072
Complaints	6,548

Total for field inspectors 26,435
of materials, etc., by the principal assistant, visits to homes of witnesses, police

Inspections of a general nature by the head of the office, 1,481; examination court, and general police work which does not appear elsewhere, 621; and special inspections in connection with general construction work for the District, 582. These added to number of "field inspections" make a total of 29,119 recorded inspections.

In addition to recorded inspections, one of the force has been solely and continuously on inspection work on the dormitories, dwellings, and other buildings erected by the United States Housing Corporation, dividing his time between the projects at the Union Station Plaza, Fourteenth and B Streets NW., and the navy yard groups.

The following table shows the total inspections made each year since the fiscal year 1895:

1895-6	8,677	1907-8	29,547
1896-7	14,112	1908-9	39,404
1897-8	17,550	1909-10	44,953
1898-9	17,600	1910-11	46,035
1899-1900	17,405	1911-12	45,875
1900-1	19,965	1912-13	41,644
1901-2	32,621	1913-14	37,177
1902-3	25,297	1914-15	37,478
1903-4	25,637	1915-16	35,742
1904-5	27,337	1916-17	35,189
1905-6	30,185	1917-18	29,638
1906-7	32,190	1918-19	29,119

The total number of inspections made by the field force divided by the actual number of days on duty shows that the average day's work was about 13½ per cent inspections per day. The largest number of inspections in any one day was 38.

It is estimated that new plumbing work to the extent of \$778,969 was installed in privately owned buildings during the year, and that about \$561,870 was expended for remodeling and repairs to existing plumbing. The best estimate obtainable is that the District government, the officer in charge of public buildings and grounds, the architect of the Capitol, and the United States Housing Corporation, spent for new and repair work in the District, \$1,720,000 and \$80,000, respectively, making a grand total of more than \$3,000,000 spent for plumbing work here during the year.

POLICE COURT CASES.

The total number of warrants obtained was 20, divided as follows:

Violations of the plumbing regulations.....	13
Work done by unlicensed plumbers.....	7
Total	20

These cases were disposed of as follows:

Noelle-rossed on compliance with commissioners' order.....	8
Fined.....	9
Personal bonds.....	2
Dismissed.....	1

Total	20
Amount collected from fines.....	\$122
Preliminary inspections.....	1,025

OFFICE WORK.

The following table shows the amount of office work performed during the past year and a comparison with that of the preceding five years:

	1914	1915	1916	1917	1918	1919
Official letters.....	1,128	877	845	978	604	892
Unofficial letters.....	4,128	3,957	3,742	3,563	2,714	3,322
Indorsements.....	2,118	1,180	1,300	1,092	692	987
Inspectors' reports.....	9,015	9,715	9,440	9,345	7,754	9,921
Indexes.....	1,683	1,332	1,400	1,579	2,278	4,551
Plans prepared.....	26	20	24	27	17	22
Specifications prepared.....	34	66	55	63	15	31
Plans and specifications revised.....	1	1	3	2	6	10
Examination of plans for new buildings.....	1,857	1,486	1,361	1,567	734	986
Examination of applications for minor buildings and repairs.....	3,138	3,347	2,955	2,761	2,604	2,152

Postage stamps used: 3-cent, 1,994; 2-cent, 2,265; 1-cent, 796. Car tickets used, 886.

REGULATIONS.

But one change of any moment was made in the plumbing code during the year, and that provided for broadening the scope of, and conditions under which loop or circuit venting could be used, especially in dwellings and small apartment houses. This regulation now provides that by slightly increasing the size of the waste pipe, two to three branch vent pipes may be omitted at a conservatively estimated saving in labor and material of \$20 a bathroom. Assuming this year's permits for building dwellings and small apartment houses, it would have, if availed of, saved the property owners nearly \$20,000.

COMPULSORY DRAINAGE.

Forty-one cases were recommended, during the last year, for compulsory sewer and water connections, by the health department and other branches of the District Government and notices were served in each of these cases. Sixteen of these notices were complied with by owners or agents; on four of the cases the work was done by the District of Columbia and assessment made, and there are 21 cases pending. In four of them, further action is suspended as the buildings are not now occupied. Some of the pending cases were ready for prosecution but the appropriation was exhausted within three months.

It is recommended that in the future this appropriation be made \$5,000, as it was several years ago, instead of the current \$1,000. This is a reimbursable appropriation, in that, with the exception of not to exceed \$50 each year, the expended amounts are returned to the Treasury as an assessment under the general taxes.

PLUMBING BOARD.

There were 24 regular meetings held for the examination and rating of candidates for master plumbers and gasfitters during the last year. The total number examined was 29. The number of original candidates examined for licensing as master plumbers and gasfitters was 14, of whom 2 passed. Of the 15 who had been previously examined for licensing as master plumbers and gasfitters (3 of whom have taken the examination two or more times within the fiscal year), 3 passed and 12 failed.

Examinations of candidates appearing before the board one or more times, resulted as follows:

Examination.	Passed.	Failed.	Examination.	Passed.	Failed.
First.....	2	14	Sixth.....		1
Second.....	2	4	Seventh.....		
Third.....	3		Eighth.....		
Fourth.....	2		Ninth.....		1
Fifth.....					

There were, on June 30, 1919, 233 registered master plumbers, about 179 being actively engaged in business. There were also 8 registered gas fitters in business.

PUBLIC CONVENIENCE STATIONS.

Four public convenience stations were in operation during the year, open from 6 a. m. until midnight, with two shifts of attendants, each working nine hours per day. The station at Seventh Street and Pennsylvania Avenue NW, accommodated 10,027,848 persons; the one at Thirteenth-and-a-half Street and Pennsylvania Avenue, 1,111,984; at Ninth and K Streets NW, 1,439,472; and at Fifteenth Street and Maryland Avenue NE, 721,988 during the year, making a total patronage of 13,301,292, being more than a million a month for the four stations, or 37,500 per day, 2,100 per hour, nearly 35 per minute, all the time the stations were open.

The patronage of women amounted to nearly 16 per cent of the whole number, and they contributed about 20 per cent of the cash receipts. This money was received for use of pay toilets, the rental of clean towels, shoe-shining concessions, telephone commissions, etc., and amounted to \$7,019.75, being slightly over 45 per cent of the total cost of operating the stations. This is more than double the showing of any of the 12 cities of which we have record.

The patronage of these stations has nearly doubled in a year and a half, partly attributable to the increase in population and partly to the closing of the saloons, which all provided general toilet facilities.

There are several locations where the need for them is pressing, and it is urgently recommended that not only the enlargement of the station at Seventh Street and Pennsylvania Avenue be considered, but that steps be taken to obtain appropriations for one additional station each year.

WAR BUILDINGS.

Not only were many large temporary Government office buildings constructed in the District in which the General Government type of plumbing, which is well suited to such structures, was installed, but the United States Housing Corporation constructed three great groups of dormitories and commandeered many vacant dwellings for use of war workers. In many cities throughout the country there was much friction between this great Government agency and the local authorities, especially as relating to plumbing matters. The officers of the corporation here took the question up with this office in a fair and just spirit, and with exception of very minor changes the plumbing work was planned and installed in accordance with the District regulations and the highest type of sanitary construction.

I take this opportunity to state, as the opinion of this office, that the plumbing work installed in the three great housing groups, and later tested by the District inspector, is as perfectly substantial and sanitary as in any hotel or apartment house in the city, and to acknowledge the unfailing courtesy of the officials of that corporation in all our dealings.

"OUR SERVICE FLAG."

From a normal force of 17, 9 men went from this office into uniform, 1 of whom, John J. Murphy, seaman, United States Navy, and formerly an assistant inspector, died in service.

Four had service in France, and five won commissions; one major and one captain of Infantry, one first lieutenant and one second lieutenant of Engineers, and one second lieutenant in the Air Service.

In addition to the nine who went, two others applied for service, but were rejected on physical grounds.

In conclusion, I beg to commend to you the employees of this office, and especially the "field force," for their conscientious and faithful performance of duty during the past year, many times under trying conditions and at all times under the burden of a salary insufficient for even a reasonably adequate support.

A. R. McGONEGAL,
Inspector of Plumbing.

The INSPECTOR OF BUILDINGS.

REPORT OF THE PERMIT CLERK.

WASHINGTON, D. C., August 15, 1919.

SIR: I have the honor to submit the annual report of this office, giving the character and number of permits issued during the fiscal year ended June 30, 1919:

PERMITS FOR WHICH FEES WERE PAID.

Water connections	\$853
Repairs	661
Sewer connections	935
Repairs	718
Gas and electric light connections	1,531
Repairs	223
Auto tire-inflating, gasoline and steam lines	16
Conduits, electric, construct and repair	226
Gas mains, construct and repair	87
Guard stones, place in alleys	11
Manholes, construct, enlarge, also connect with sewers	109
Oil pipe lines, repair	1
Parking fences, erect	194
Pipes, lay across sidewalks, also alleys	2
Poles, telegraph and telephone, erect, replace, and remove	443
Tags for wagons	270
Total	6,280

PERMITS FOR WHICH FEES ARE NOT PAID.

Alleys, grade	3
Blasting	10
Bridges across gutters	5
Cables, string aerial	68
Copings, erect	44
Driveways, construct and repair	77
Engines, steam shovels, and heavy machinery, move through streets	156
Fences inclosing parkings, repair	30
Parking leads, lay and repair	139
Parkings, pave	35
Permits, renew and extend	41
Poles, replace trolley	5
Pumping line, oil, repair	1
Roadways, close temporarily	13
Roadways, grade and repair	58
Sidewalk space, grade	8
Sidewalks, haul across	42
Sidewalks, lay and repair	115
Sidewalk and roadway, occupy temporarily	2

Sidewalks, use for business purposes	5
Shelter houses, erect and place at curb	2
Steam and electric railways	14
Steps in terraces, construct and repair	67
Stopcock boxes, regulate and replace	49
Trees, trim and remove	43
Tree space, pave	16
United States Government	50
Walls, retaining, build or repair	86
Water tables, lay and repair	34
Wires, string overhead connections	255
Special water, sewer, gas, and electric	569
Miscellaneous	15
Total	2,057

One thousand nine hundred and seventeen communications were referred to this office, briefs were made on cards, permits issued when necessary, reports made, papers indorsed and returned to the respective divisions having supervision over the inspection of the work for which permits were issued.

Applications for all permits were sorted, arranged according to location of the work, and filed for ready reference. Written report was made of all permits for excavations in the public space and forwarded to the engineer of highways.

Very respectfully,

H. M. WOODWARD,
Permit Clerk.

To the INSPECTOR OF BUILDINGS,

REPORT OF THE ELECTRICAL ENGINEER.

WASHINGTON, October 10, 1919.

SIR: I have the honor to submit the following report of the operations of the electrical department for the fiscal year ended June 30, 1919.

Very respectfully,

WARREN B. HADLEY,
Electrical Engineer.

ASSISTANT TO THE ENGINEER COMMISSIONER.

STREET LIGHTING.

The street lighting system has again been maintained and the most necessary sporadic additions and extensions made, improvement projects having been again deferred by reason of war and after-war conditions.

IMPROVED INCANDESCENT ELECTRIC LIGHTING.

This system has been extended only by the installation of eighteen 100-candlepower lamps, in completion of the treatment of the area Seventeenth to Twenty-third, B to E Streets NW., in the vicinity of the temporary Federal Government buildings, by five 100-candlepower lamps on B Street between First and Second Streets Northeast, and by one 100-candlepower lamp on Sixteenth Street Northwest, at Colorado Avenue.

NERNST LAMPS.

The sixty-four 4-glower Nernst lamps on the Connecticut Avenue Bridge across Rock Creek were replaced by sixty-four 200-candlepower filament lamps, the progress in efficiency development of the latter and the recent poor quality of material in maintenance parts for the former resulting in treating the Nernst lamp as obsolete.

ARC LIGHTING.

This system has been affected only by the discontinuance of two 4-ampere magnetite lamps.

LIGHTING ALONG STEAM RAILROADS.

The situation with respect to the several suits brought by the District of Columbia against steam railroad companies to compel repayment for the sums expended by the District in maintaining lights along the respective rights of way of such companies, has been affected only by the obtaining of a verdict

and judgment for approximately \$11,000 in a suit against Washington Terminal Co., followed by appeal to Court of Appeals. Further suits have been entered on newly accrued claims.

SIGNAL SYSTEMS.

The fire-alarm telegraph, police patrol signal and the telephone systems have been operated and maintained and each has expanded slightly in the line of natural growth. The distribution plant of these combined systems was increased by the net addition of nearly 100 miles of conductor to a present total of upward of 6,300 miles.

INSPECTION OF ELECTRICAL WIRES AND APPARATUS.

It is notable that the general and pronounced falling off in building operations during the year did not result in a diminution in the number of electrical inspections. Furthermore the growing average complexity of electric installations with the expansion of the business and the multiplication of kinds of utilization appliances and the increasing thoroughness of inspection with growing realization of need, result in lessening the average number of inspections possible per day per inspector. With the resumption of building activity, an increase of this inspection force appears essential.

LAMPS OF ALL KINDS IN SERVICE JULY 1, 1919, AS COMPARED WITH JULY 1, 1918.

Kind of light.	1918	1919
Mantle gas.....	10,417	10,431
Electric arc:		
6.6-ampere magnetite.....	280	280
4-ampere magnetite.....	517	515
Electric incandescent:		
25-can Heliower, series.....	10	10
2) 10-can Heliower, multiple.....		64
1) 10-can Heliower, series.....	3,699	3,772
1) 10-can Heliower, multiple.....	68	98
6-can Heliower, series.....	3,588	3,637
6-can Heliower, multiple.....	321	318
4-glower Nernst.....	64	.....
Street illumination lamps:		
Gas.....	393	394
Electric.....	119	131
Total.....	19,596	19,650

Net increase during year, 144 lamps.

During the year the following changes have been made in the various forms of street lighting:

Kind of light.	Added.	Discontinued.
Mantle gas.....	71	157
Electric arc, 4-ampere magnetite.....		2
Electric incandescent:		
2) 10-can Heliower, multiple.....	64	.....
1) 10-can Heliower, series.....	92	19
6-can Heliower, series.....	49	.....
6-can Heliower, multiple.....	2	5
4-glower Nernst.....		264
Street illumination lamps on fire-arm posts: Gas.....	2	1
Electric incandescent.....	12	.....
Total.....	292	148

¹ Of this number, 33 were replaced by 100-can Heliower and 5 by 60-can Heliower incandescent electric lamps.

² Five lamps were replaced by 20-can Heliower incandescent electric lamps.

Net increase during the year, 144 lamps.

Summary of changes.

Net increase in number of lamps.....	144
Discontinued.....	46
Replaced by other kinds.....	102
Total changes.....	292

Sidewalks, use for business purposes	5
Shelter houses, erect and place at curb	2
Steam and electric railways	14
Steps in terraces, construct and repair	67
Stopcock boxes, regulate and replace	49
Trees, trim and remove	43
Tree space, pave	16
United States Government	50
Walls, retaining, build or repair	86
Water tables, lay and repair	34
Wires, string overhead connections	255
Special water, sewer, gas, and electric	569
Miscellaneous	15
Total	2,057

One thousand nine hundred and seventeen communications were referred to this office, briefs were made on cards, permits issued when necessary, reports made, papers indorsed and returned to the respective divisions having supervision over the inspection of the work for which permits were issued.

Applications for all permits were sorted, arranged according to location of the work, and filed for ready reference. Written report was made of all permits for excavations in the public space and forwarded to the engineer of highways.

Very respectfully,

H. M. WOODWARD,
Permit Clerk.

To the INSPECTOR OF BUILDINGS.

REPORT OF THE ELECTRICAL ENGINEER.

WASHINGTON, October 10, 1919.

Sir: I have the honor to submit the following report of the operations of the electrical department for the fiscal year ended June 30, 1919.

Very respectfully,

WARREN B. HADLEY,
Electrical Engineer.

ASSISTANT TO THE ENGINEER COMMISSIONER.

STREET LIGHTING.

The street lighting system has again been maintained and the most necessary sporadic additions and extensions made, improvement projects having been again deferred by reason of war and after-war conditions.

IMPROVED INCANDESCENT ELECTRIC LIGHTING.

This system has been extended only by the installation of eighteen 100-candlepower lamps, in completion of the treatment of the area Seventeenth to Twenty-third, B to E Streets NW., in the vicinity of the temporary Federal Government buildings, by five 100-candlepower lamps on B Street between First and Second Streets Northeast, and by one 100-candlepower lamp on Sixteenth Street Northwest, at Colorado Avenue.

NERNST LAMPS.

The sixty-four 4-glower Nernst lamps on the Connecticut Avenue Bridge across Rock Creek were replaced by sixty-four 200-candlepower filament lamps, the progress in efficiency development of the latter and the recent poor quality of material in maintenance parts for the former resulting in treating the Nernst lamp as obsolete.

ARC LIGHTING.

This system has been affected only by the discontinuance of two 4-ampere magnetite lamps.

LIGHTING ALONG STEAM RAILROADS.

The situation with respect to the several suits brought by the District of Columbia against steam railroad companies to compel repayment for the sums expended by the District in maintaining lights along the respective rights of way of such companies, has been affected only by the obtaining of a verdict

and judgment for approximately \$11,000 in a suit against Washington Terminal Co., followed by appeal to Court of Appeals. Further suits have been entered on newly accrued claims.

SIGNAL SYSTEMS.

The fire-alarm telegraph, police patrol signal and the telephone systems have been operated and maintained and each has expanded slightly in the line of natural growth. The distribution plant of these combined systems was increased by the net addition of nearly 100 miles of conductor to a present total of upward of 6,300 miles.

INSPECTION OF ELECTRICAL WIRES AND APPARATUS.

It is notable that the general and pronounced falling off in building operations during the year did not result in a diminution in the number of electrical inspections. Furthermore the growing average complexity of electric installations with the expansion of the business and the multiplication of kinds of utilization appliances and the increasing thoroughness of inspection with growing realization of need, result in lessening the average number of inspections possible per day per inspector. With the resumption of building activity, an increase of this inspection force appears essential.

LAMPS OF ALL KINDS IN SERVICE JULY 1, 1919, AS COMPARED WITH JULY 1, 1918.

Kind of light.	1918	1919
Mantle gas.....	10,417	10,431
Electric arc:		
66-a incandescent.....	280	280
4-armore magnetite.....	517	515
Electric incandescent:		
25-can Heflower, series.....	10	10
21-can Heflower, multiple.....		64
11-can Heflower, series.....	3,699	3,772
11-can Heflower, multiple.....	98	98
61-can Heflower, series.....	3,588	3,637
61-can Heflower, multiple.....	321	318
4-flower Nernst.....	64	
Street illumination lamps:		
Gas.....	393	394
Electric.....	119	131
Total.....	19,596	19,650

Net increase during year, 144 lamps.

During the year the following changes have been made in the various forms of street lighting:

Kind of light.	Added.	Discontinued.
Mantle gas.....	71	157
Electric arc, 4-armore magnetite.....		2
Electric incandescent:		
21-can Heflower, multiple.....	64	
11-can Heflower, series.....	92	19
61-can Heflower, series.....	49	
61-can Heflower, multiple.....	2	5
4-flower Nernst.....	2	2
Street lighting lamps on fire-arm posts: Gas.....	12	1
Electric incandescent.....		
Total.....	292	148

¹ Of this number, 33 were replaced by 100-can Heflower and 5 by 60-can Heflower incandescent electric lamps.

² The 4 lamps were replaced by 20-can Heflower incandescent electric lamps.

Net increase during the year, 144 lamps.

Summary of changes.

Net increase in number of lamps.....	144
Discontinued.....	46
Replaced by other kinds.....	102
Total changes.....	292

Table installed and withdrawn during the year and amount in service June 30, 1919.

INSTITUTO

Size of cable.	Signal.	Telephone.		Combination.						Total.	
		Conductors (Brown & Sharpe).		(Conductors (Brown & Sharpe).				Conductors (Brown & Sharpe).			
		Cable.	Cable.	No. 19.	No. 22.	Cable.	No. 11.	No. 19.	No. 14.	No. 19.	No. 22.
Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
50-pair.....	897	897	89,700	118	15	3,540	30	7,080	118	3,540	7,080
45-pair.....				1,938	10	38,700	25	96,500	1,938	38,700	96,500
35-pair.....				1,617	10	32,310	20	64,680	1,617	32,310	64,680
30-pair.....				1,392	6	23,112	6	23,112	1,392	23,112	23,112
22-pair.....				11,326	4	60,208	4	50,208	11,326	50,208	50,208
8-pair.....				764	3	3,844	2	2,656	664	3,844	2,656
5-pair.....				782	2	3,128	1	1,564	782	3,128	1,564
Total.....	897	89,700	.....	18,321	.....	195,072	.....	286,200	19,218	195,072	375,900
WITHDRAWN.											
12-pair.....				888	6	10,636	6	10,636	888	10,636	10,636
10-pair.....				112	5	1,120	5	1,120	112	1,120	1,120
8-pair.....				1,603	4	12,872	4	12,872	1,603	12,872	12,872
6-pair.....				820	2	3,280	1	1,640	820	3,280	1,640
Total.....				3,423	.....	27,928	.....	26,288	3,423	27,928	26,288

INSERIMENT JUNE 30, 1919.

In stalled 3,646 miles of cable containing 108,114 miles of conductor; withdrawn, 0.619 miles of cable containing 6,502 miles of conductor.

Amount of space occupied by cable installed and withdrawn during year and that in service July 1, 1919.

Ownership of conduit.	Space occupied by cable.		
	Installed during year.	Withdrawn during year.	In service, July 1, 1919.
District of Columbia.....	<i>Feet.</i> 7,501	112	20,215
Chesapeake & Potomac Telephone Co.....	8,490	2,497	581,349
Washington Railway & Electric Co. ¹	1,279		32,423
United States Government.....	1,948		3,484
Western Union Telegraph Co.....			7,180
Washington Terminal Co.....			1,019
Submarine cable.....			150
Placed in parking.....		820	2,997
Miscellaneous.....			3,368
Total.....	19,218	3,429	835,185

¹ Under this name are included the conduits of all companies controlled by this corporation.

Aerial cable in service June 30, 1919.

Size of cable.	Combination.				
	Cable.	Conductors (Brown & Sharpe).			
		No. 14.	No. 19.		
		Pair.	Conduc- tors.	Pair.	
25-pair.....	<i>Feet.</i> 7,358	10	<i>Feet.</i> 147,160	No. 15	<i>Feet.</i> 220,740
15-pair.....	8,625	6	103,500	9	153,250
12-pair.....	9,558	6	114,696	6	114,696
8-pair.....	852	4	6,816	4	6,816
Total.....	26,393	.....	372,172	.....	497,502

In service June 30, 1919, 4,999 miles of cable, containing 164.71 miles of conductor.

TELEPHONE SYSTEM.

The following 36 telephones were added to the two switchboards of the department during the year:

District Building:

Office of Commissioner Gardiner, extension.....	1
Office of secretary board of commissioners (one extension) room 513.....	
Office of Assistant Engineer Commissioner Brown (one extension) room 304.....	2
Office of health officer, room 205.....	1
Office of building inspector, room 103.....	1
Office of assessor, room 101.....	1
Office of surveyor, extension, room 403.....	1
Office of corporation counsel, corridor, fourth floor.....	1
Office of supervisor of city refuse, room 331-A.....	1
Print shop, sub-basement.....	1
Carpenter shop, sub-basement.....	1
Storeroom, sub-basement.....	1
Selective military service headquarters, extension, room 513.....	1
Selective military service, local board No. 7, room 111.....	1

Outside offices:

Supervisor of city refuse, New Jersey Avenue and K Street SE-----	1
Garbage transfer station, extension, Second and K Streets SE-----	1

Playgrounds—

Willowtree Alley-----	1
Garfield Park-----	1

Fourteenth Street and Park Road NW-----	1
Columbia Road, between Seventeenth and Eighteenth Streets NW-----	1

Health department clinic, 409 Fifteenth Street NW-----	3
Probation officer, police court building (one extension)-----	2

Public schools:

Manual training, Eighth and I Streets NE-----	1
Old M Street High School-----	2
Chevy Chase School, extension-----	1
Business High School-----	1
Wallach School-----	2
Thomson School-----	1
Webster School-----	1

The following 10 telephones on these switchboards were discontinued during the year:

District Building:

Office selective military service headquarters, room 513-----	3
---	---

Selective military service local boards:

No. 4, room 403-----	1
No. 7, room 111-----	1
No. 9, corridor, first floor-----	1
No. 11, room 428-----	1

Public schools:

Mott School-----	1
Berrett School-----	1
Garnet School-----	1

Fire department switchboard: One telephone was added to this switchboard during the year.

Police department switchboard: Seven telephones were added to this switchboard during the year.

Franklin School switchboard: One telephone was added to this switchboard during the year.

McKinley Manual Training School switchboard: One telephone was added to this switchboard during the year.

James Ormond Wilson Normal School: One telephone was added to this switchboard during the year.

Public Library switchboard: One telephone was added to this switchboard during the year.

Number of telephones connected to the District system July 1, 1919.

Offices of the District building-----	196
Outside offices and institutions-----	94
Residences -----	3
Public schools-----	223
Fire department-----	57
Police department-----	60
Water department, private branch exchange-----	42
Franklin School, private branch exchange-----	37
Western High School, private branch exchange-----	17
McKinley Manual Training School, private branch exchange-----	17
James Ormond Wilson Normal School, private branch exchange-----	30
Miner Normal School, private branch exchange-----	12
New Central High School, private branch exchange-----	36
Dunbar High School, private branch exchange-----	18
Public Library, private branch exchange-----	21
Washington Asylum and Jail, private branch exchange-----	17
Municipal Court, private branch exchange-----	6
District repair shop, private branch exchange-----	6
Police-patrol service-----	465

Total -----	1,357
-------------	-------

There are 27 portable telephone sets in service, the property of the District of Columbia. These instruments are used by the fire department and the employees of the electrical department.

STORAGE BATTERY SYSTEM.

The number of cells of storage battery in service July 1, 1919, was as follows:	
On fire-alarm circuits-----	1,862
On patrol circuits-----	226
On local circuits-----	86
Total -----	2,174

DISTRICT UNDERGROUND CONDUIT AND CABLE SYSTEM.

The following conduit connections were made to the underground system:

Fire-alarm posts (total, 4).

Twentieth and G Streets NW.
Fourteenth and Buchanan Streets NW.
Wisconsin Avenue and Porter Street NW.
Fourteenth and Otis Streets NW.

Patrol posts (total, 1).

Twenty-seventh Street and Woodley Road NW.

Connections to buildings (total, 1).

Eighth and I Streets NE.

In making the above-mentioned connections and extensions 108 feet of conduit (duct feet) were constructed, the work being done by this department.

Connections to the underground system, July 1, 1919.

Fire-alarm posts-----	445	United States Government buildings-----	24
Police-patrol posts-----	354	Private buildings-----	61
Cable terminal posts-----	6	Cable poles-----	65
Schoolhouses-----	80	Total-----	1,101
Fire-department houses-----	34		
Police station houses-----	13		
Miscellaneous District buildings-----	19		

POLICE PATROL SYSTEM.

The following changes and new installations were made in the patrol system:
Sixth Precinct.—New installation, connected underground; box No. 27, Fourth and E Streets NW.

Tenth Precinct.—New installation, connected overhead; box No. 19, Fifteenth and Dahlia Streets NW.

Eleventh Precinct.—Changed from overhead to underground connection; box No. 25, Fourteenth and U Streets SE.; box No. 26, Fifteenth and V Streets SE.; box No. 54, Thirteenth and W Streets SE.

Subprecinct, Tenallytown.—New installation, connected underground; box No. 33, Twenty-seventh Street and Woodley Road NW.

On July 1, 1919, the distribution of boxes among the precincts was as follows:

	Wall boxes.		Booths.	Total.
	Under-ground.	Over-head.		
First.....	37	.....		37
Second.....	27	.....		27
Third.....	50	.....		50
Fourth.....	37	2		39
Fifth.....	44	2		46
Sixth.....	29	.....		29
Seventh.....	22	3		25
Eighth.....	27	.....		27
Ninth.....	34	18		52
Tenth.....	49	10	1	60
Eleventh.....	3	34	1	38
Subprecinct, Ternallytown.....	10	19	1	30
Total.....	1,369	88	3	460

¹ Six of these boxes at following locations are not on posts: 3, Union Station; 1, engineer stables, First and Canal Streets; 1, Takoma Park, watch box; 1, Treasury Department.

FIRE-ALARM SYSTEM.

Thirty-nine fire-alarm boxes were placed in service during the year, 24 public and 15 private boxes, located as follows:

Public boxes.

- No. 364, Twentieth and G Streets NW.
- No. 371, Eighteenth and D Streets NW.
- No. 743, Forty-seventh and Fessenden Streets NW.
- No. 744, Wisconsin Avenue and Porter Street NW.
- No. 746, Belt Road and Ingomar Street NW.
- No. 747, Thirty-third and Rittenhouse Streets NW.
- No. 748, Conduit Road and Reservoir Street NW.
- No. 749 Conduit Road and Jewett Street NW.
- No. 915, Fifteenth and U Streets SE.
- No. 977, Thirty-sixth Street and Benning Road NE.
- No. 992, Forty-eighth and Meade Streets NE.
- No. 6177, Bladensburg Road and Douglas Street NE.
- No. 6185, Fifteenth and Irving Streets NE.
- No. 6186, Thirteenth and Newton Streets NE.
- No. 6187, Fourteenth and Monroe Streets NE.
- No. 6188, Twelfth and Perry Streets NE.
- No. 6189, Thirteenth and Quincy Streets NE.
- No. 6191, Eighteenth and Lawrence Streets NE.
- No. 8161, Fourteenth and Otis Streets NW.
- No. 8164, Fourteenth and Buchanan Streets NW.
- No. 8176, Thirteenth and Dogwood Streets NW.
- No. 8177, Thirteenth and Geranium Streets NW.
- No. 8191, Third and Rittenhouse Streets NE.
- No. 8192, Blair and Bates Roads NW.

Private boxes.

- No. 61, Administration building, War Workers' Dormitories, Union Station Plaza.
- No. 66, Administration building, War Workers' Dormitories, North Capitol Street between B and C Streets NE.
- No. 398, Navy Department Building, Potomac Park NW.
- No. 399, War Department Building, Potomac Park NW.
- No. 468, United States Government building "D," between Maine and Missouri Avenues, Four-and-a-half and Sixth Streets (west).
- No. 469, United States Government building "E," between Maine and Missouri Avenues, Four-and-a-half, and Sixth Streets (west).
- No. 474, United States Government building "F," Seventh Street between B Street north and south (west).

- No. 485, Enlisted men's barracks, East Potomac Park.
 No. 489, Smithsonian Building, near Tenth and B Streets SW.
 No. 536, United State Navy Yard, Fourth and M Streets SE., at entrance.
 No. 585, Washington Gas Light Co. plant, Twelfth Street between M and N Streets SE.
 No. 592, United States Public Health Service, New Jersey Avenue and B Street SE.
 No. 797, Experimental Station, Bureau of Mines, American University.
 No. 1227, Palace Theater, 1306 F Street NW.
 No. 1289, New National Museum Building, Tenth and B Streets NW.
 One private box, No. 454, located at the Norfolk and Washington Steamboat wharf, foot of Seventh Street SW., was discontinued during the year.
 During the year three boxes were changed from overhead to underground connection.

Fire-alarm boxes in service.

	July 1, 1918.	July 1, 1919.
Connected by overhead wires:		
Public boxes.....	65	80
Private boxes.....	21	22
Connected by underground wires:		
Public boxes.....	436	445
Private boxes.....	115	128
Total.....	637	675

Alarms received and transmitted.

Regular box alarms.....	1,111
Alarms received from telephone stations.....	3
Local alarms.....	1,110
Second alarms.....	20
Third alarms.....	3
Fourth alarms.....	1
Fifth alarms.....	0
Sixth alarms.....	0
Total.....	2,248
False box alarms.....	246
False local alarms.....	46

Each fire-alarm box was tested several times during the year, the contact points cleaned and the mechanism overhauled. This is done regularly once a month as far as possible. The total number of tests amounted to 3,334, being an average of 4.939 per box.

Alarms received by the month.

	Box.		Local.		Addi- ti- nal alarms.
	Number.	False.	Number.	False.	
1918.					
July.....	60	3	75	1	1
August.....	67	5	79	2	4
September.....	67	17	61	5	3
October.....	115	25	86	1	1
November.....	139	48	150	1	2
December.....	95	26	118	6	4
1919.					
January.....	123	34	84	3	6
February.....	114	26	109	3	5
March.....	88	16	135	5	3
April.....	100	16	103	5	1
May.....	74	20	57	5	2
June.....	72	10	53	9	-----
Total.....	1,114	246	1,110	46	24

POLES.

Under the authority of the act of Congress, approved June 30, 1902, regulating the use of telephone wires in the District of Columbia, the Chesapeake & Potomac Telephone Co. has reported the following amount of work done during the fiscal year:

Poles erected in alleys within the prescribed area:

Line	7
Guy	3
Anchors	3
	13

Poles erected in streets outside the prescribed area:

Line	29
Guy	8
Anchors	13
	50

Poles erected in alleys outside the prescribed area:

Line	39
Guy	13
Anchors	24
	56

Total 139

Poles taken down in alleys within the prescribed area:

is taken down in alleys within the prescribed area.
Line _____ 8
Guy _____ 1
Anchors _____ 2

Poles taken down in streets outside the prescribed area: Line

Poles taken down in alleys outside the prescribed area

Line	11
Guy	4
Anchors	4
	19

Total 43

Total erected during the year _____ 139
Total taken down during the year _____ 43

Net increase----- 96

Miscellaneous pole work—poles erected, taken down, moved, etc.

	Erected.			Taken down.			Moved.			Replaced.			Reset.			Increase.		
	Line.	Guy.	Anchor.	Line.	Guy.	Anchor.	Line.	Guy.	Line.	Guy.	Line.	Guy.	Line.	Guy.	Line.	Guy.	Line.	Guy.
Chesapeake & Potomac Telephone Co.	75	24	40	32	5	6	35	2	64	2	24	—	43	19	—	—	—	—
Potomac Electric Power Co.	142	13	18	2	1	8	—	—	—	—	—	—	149	12	—	—	—	—
Western Union Telegraph Co.	4	—	—	—	—	—	4	—	—	—	—	—	4	—	—	—	—	—
Postal Telegraph-Cable Co.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Capital Traction Co.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
City & Suburban Ry. Co.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Georgetown & Tenneytown Ry. Co.	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2
East Washington Heights Traction Ry. Co.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Brightwood Ry. Co.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total.	221	39	58	34	6	14	41	5	70	2	24	—	187	33	—	—	—	—

List of poles of all kinds, July 1, 1919.

	Line.	Guy.	Total.			Line.	Guy.	Total
District of Columbia.....	460	13	473	Washington & Maryland Ry. Co.....		158		158
United States Government.....	297	1	298	Georgetown & Tenleytown Ry. Co.....		304		304
Chesapeake & Potomac Telephone Co.....	6,457	688	7,145	Washington Interurban R. R. Co.....		187	4	191
Potomac Electric Power Co.....	6,641	259	6,900	East Washington Heights Transit Co.....		65		65
Western Union Telegraph Co.....	912		912	Frightwood Ry. Co.....		341		341
Postal Telegraph-Cable Co.....	355	9	364	Washington & Glen Echo Ry. Co.....		8		8
Baltimore & Washington Transit Co.....	30		30	Capital Ry. Co.....		208		208
Capital Traction Co.....	204		204	Total.....		18,123	981	19,104
City & Suburban Ry. Co.....	87	2	89					
Washington & Great Falls R. R. Co.....	401	1	402					
Columbia Ry. Co.....	463	4	467					
Steam railroads.....	545		545					

ELECTRICAL WIRING INSPECTIONS.

The following tables show the amount of work performed by this department in connection with electric-wiring inspections:

Notices received from the inspector of buildings of permits indicating electric wiring:

Building	954
Machinery	259
Signs	12
Total	1,225

Permits issued by the electrical department for installations:

Without fee (ordered by District of Columbia, etc.)	168
Covered by building permits.....	958
Not covered by building permits.....	2,203
For temporary work.....	37
Quarterly (maintenance of plants, etc.)	43
	3,409
For temporary use of current.....	200
Total	3,609

Certificates issued:

Final (including 17 without fee)	2,708
Preliminary	1
Total	2,709

Lamps and apparatus installed.	Number.	Approximate kilowatts.
Lamps, incandescent.....	60,757	2,430
Lamps, arc.....	16	88
Motors.....	686	4,164
Devices, miscellaneous.....	5,910	738
Blank outlets.....	128	
Total	67,497	7,420

Defective wiring discovered and reported by inspectors, extra of routine inspection work.....

531

Notices of defective wiring sent.....

1,219

Requests for inspection (not related to work already under permit)

323

Miscellaneous jackets (specifications, etc., for District of Columbia work, etc.)	343
Notices received from the superintendent of licenses, leading to original inspection or periodic (annual) reinspection of theaters, hotels, assembly halls, etc.	173
Work of inspectors of electric wiring from July 1, 1918, to June 30, 1919:	
Inspections in private buildings (not including theaters and moving-picture theaters)	10,896
Inspections in municipal buildings	197
Inspections in United States Government buildings	4
Inspections in theaters (including moving-picture theaters), including reinspections, periodic (annual) and occasional, of moving-picture theaters (more frequent periodic inspections being made by the fire marshal), and periodic reinspections (weekly or more frequently if bill changes) of theaters	740
Total	11,837
Fees paid to the collector of taxes:	
For permits	\$5,709.00
For one copy of Electric Wiring Rules and Regulations	.30
Total	5,709.30
Electric Wiring Rules and Regulations issued without fee	3

MISCELLANEOUS WORK.

This department prepared plans and specifications for and supervised the introduction of electric wiring in the following municipal properties:

Completed work.

Temporary kitchen, Washington Asylum and Hospital, lighting.
Municipal asphalt plant, lighting.

Specifications prepared—work not started.

Webster School, lighting plans.
McKinley Manual Training School, lighting fixtures in auditorium.
No. 22 engine company, District of Columbia fire department, lighting wiring and fixtures.
Engineer department stables, extension of lighting wiring.
Anacostia Bridge, power switchboard.
Municipal fish market, changes and additions to lighting and power wiring.
Home for Aged and Infirm, Blue Plains, D. C., generator panel.

Work in progress.

M Street High School, Curtis School, and Cleveland School, lighting and power in dental clinic rooms.
O Street Vocational School, lighting fixtures.
Head house and wharf, Norfolk & Washington Steamboat Co., lighting wiring, fixtures and telephone.

Numerous preliminary plans, specifications, and estimates were prepared for various proposed lighting and power projects in a number of District buildings.

Various troubles with lighting and power installations in District buildings were investigated and remedied.

GENERAL SUPPLIES.

Receipts.

Appropriation	\$15,000.00
Deficiency appropriation	2,300.00
Repayments	3,538.99
Total	20,838.99

Expenditures.

Labor pay roll-----	\$2,327.62
Office expenses-----	1,110.02
Telephone rental, etc-----	5,900.72
Instruments and apparatus-----	898.71
Storeroom expenses-----	2.51
Stable expenses-----	11.44
Wire and cable-----	2,555.68
Line supplies-----	476.40
Tools and hardware-----	96.23
Batteries and battery supplies-----	998.92
Repairs to cuts-----	43.78
Paints-----	33.19
Car tickets-----	50.00
Drayage and expressage-----	34.59
Allowance for maintenance of automobiles-----	467.42
Patrol-box keys-----	47.00
Maintenance of fire-alarm apparatus-----	748.08
Repairing lanterns-----	32.00
Fire-alarm boxes-----	1,204.50
Posts, etc-----	417.00
Remodeling storehouse-----	600.00
Miscellaneous items-----	13.78
Total-----	18,069.59

LIGHTING.

Receipts.

Appropriation-----	\$415,000.00
Repayments by Baltimore & Ohio R. R. Co-----	348.92
Repayments by Georgetown Barge, Dock, Elevator & R. R. Co-----	543.87
Repayments by Washington Terminal Co. ¹ -----	4,331.25
Repayments by Philadelphia, Baltimore & Washington R. R. Co. ¹ -----	5,873.38
Repayments, miscellaneous-----	147.69

Total-----	426,245.11
------------	------------

Expenditures.

Mantle gas lighting:	
Washington Gas Light Co-----	\$168,624.10
Deductions for defective service-----	470.37
	168,153.73
Georgetown Gas Light Co-----	10,511.76
Deductions for defective service-----	16.32
	10,495.44
	13.96
Repayment Office Public Buildings and Grounds-----	
Incandescent electric lighting:	
Potomac Electric Power Co-----	147,859.37
Deductions for defective service-----	2,434.45
	145,424.92
Electric arc lighting:	
Potomac Electric Power Co-----	63,430.15
Deductions commissioner's order July 15, 1915-----	1,806.48
Deductions for defective service-----	665.47
	60,958.20
Street designation lighting:	
Washington Gas Light Co-----	3,670.55
Deductions for defective service-----	1.89
	3,668.66
Georgetown Gas Light Co-----	259.99
Potomac Electric Power Co-----	1,286.74
Deductions for defective service-----	.70
	1,286.04

¹ Due but not paid.

OPERATIONS OF THE ENGINEER DEPARTMENT.

177

Labor pay roll	\$4,657.30
Storeroom rental	700.00
Allotment Inspector Dawson	344.40
Repairs to cuts	4.18
Traveling expenses	19.57
Remodeling storehouse	1,062.65
Baist Atlas	50.00
Blue printing	51.66
Repairing lamps	108.75
Patterns	143.75
Lamp-posts, globes, etc	12,607.00
Expressage and freight	10.00
Storeroom expenses	81.58
Street sign frames, etc	51.85
Car tickets	150.00
Tools and hardware	31.34
Stable expenses	232.16
Paints, oils, etc	101.63
Erecting, moving, and taking down posts	139.00
Street crossing lighting	230.04
Total	411,037.80

WIRES UNDERGROUND.

Receipts.

Appropriation	5,000.00
Repayments	30.02
Total	5,030.02

Expenditures.

Labor pay roll	283.12
Cable	1,592.72
Posts, etc	770.50
Line supplies	1,349.32
Remodeling storehouse	150.00
Blue printing	.63
Total	4,146.29

EXTENSIONS OF POLICE PATROL.

Receipts.

Appropriation	2,500.00
---------------	----------

Expenditures.

Labor pay roll	236.06
Police patrol boxes	78.00
Posts for patrol boxes	330.00
Cable	900.00
Remodeling storehouse	75.00
Total	1,628.06

FIRE-ALARM BOXES.

Receipts.

Appropriation	\$5,000.00
---------------	------------

Expenditures.

Labor pay roll-----	\$171.00
Fire-alarm boxes-----	3,813.00
Posts for fire-alarm boxes-----	434.00
Cable-----	27.00
Line supplies-----	293.75
 Total-----	4,981.75

ONE MOTOR-TRUCK EXCHANGE.

Receipts.

Appropriation-----	\$2,000.00
--------------------	------------

Expenditures.

One motor vehicle, Ford-----	GS2.60
------------------------------	--------

REPORT OF THE CHIEF CLERK OF THE ENGINEER DEPARTMENT

WASHINGTON, D. C., October 8, 1919.

SIR: I have the honor to submit the following report of operations in this office for the fiscal year ended June 30, 1919:

Communications received, briefed, recorded, and indexed-----	10,805
Vouchers prepared and recorded-----	315
Contracts drawn and indexed-----	200
Bonds approved and indexed-----	285

DANIEL E. GARGES,
Chief Clerk, Engineer Department

The ENGINEER COMMISSIONER.

REPORT OF THE WHARF COMMITTEE.

WASHINGTON, July 21, 1919.

SIR: The wharf committee has the honor to submit the following report for the fiscal year ended June 30, 1919:

Accompanying is a list of wharf property now under lease.

All of the leases for these wharves expired during the year and were renewed. The table shows the date of expiration of the new lease in each case. The rentals are fixed by competitive bidding after public advertisement.

The largest amount of wharf property is that along the Washington Channel. This has a total frontage on the city side of 9,275 linear feet, of which 4,675 linear feet between the Army War College and the south curb line of N Street is under the jurisdiction of the Chief of Engineers, United States Army. A portion of this is used for governmental purposes and a portion is under lease. Of the remaining 4,600 feet between the south curb line of N Street south and Fourteenth Street SW., 559 feet between Thirteenth and Fourteenth Streets is under the jurisdiction of the United States and 4,021 feet under the jurisdiction of the commissioners. Located along this frontage are the harbor police station, the dock of the harbor boat, the house and dock of the fire boat, the District morgue, a District property yard, and the municipal fish wharf and market.

The frontage between Thirteenth and Fourteenth Streets is the site of the central heat, light, and power plant for furnishing light and power to governmental buildings. This plant has not yet been constructed.

Along the Anacostia River front the United States Navy Yard occupies the frontage on the city side from Second to Eleventh Streets, and the sewerage pumping station and yard occupies the frontage between First and Second Streets. At the foot of First Street is located an intake for the Capitol power plant. There are only two privately rented frontages. One of these is at Twelfth and N Streets SE. This frontage is a part of the Anacostia Park under the jurisdiction of the District Engineer. The lease for this frontage is a tempo-

rary monthly lease at the pleasure of the District Engineer. The other is the water frontage between the building lines of Q Street SW, leased to the Standard Oil Co.

The water frontage leased to private parties is used for the following purposes: namely,

Wood yards, lumberyards, marine railways, commercial and pleasure boat traffic, and other commercial uses. The recent proposals received for leasing the water fronts do not indicate that there is much demand for water frontage.

The wharf property along the Georgetown Channel of the Potomac River is under private control with the exception of the foot of streets. The foot of one street only is leased by the District of Columbia.

On September 2, 1918, the wharf leased to the Norfolk & Washington Steamboat Co., including the structures thereon, was practically destroyed by fire and the steamboat company was given the use of the old ferry wharf until the necessary reconstruction of the wharf and structures could be effected. This is now being done from the amount received from the insurance and from an appropriation made by Congress for constructing headhouse and sheds.

Respectfully submitted,

DANIEL E. GARGES, *Chairman*,
D. E. McCOMB,
RUSSELL DEAN,

Wharf Committee.

To the ENGINEER COMMISSIONER.

List of wharf property under lease June 30, 1919.

POTOMAC RIVER FRONT.

Name of lessee.	Location.	Expires.	Water front-age.	Area.	Rental per year.
Capital Yacht Club.....	Foot of Ninth Street SW., between structures 39 and 41.	July 1, 1923	<i>Lin. ft.</i> 24	<i>Sq. ft.</i> 2,080	\$75.00
L. A. Clarke & Son.....	Sec. 2, structures 68 to 77, including 70½, foot of Tenth Street SW.	Aug. 1, 1923	280	45,000	1,500.00
Colonial Beach Co.....	Sec. 1, structures 39 to 37, inclusive, Water Street between M and N Streets.	Mar. 15, 1923	132	8,000	600.00
Do.....	Sec. 1, structures 26 to 30, inclusive, foot of N Street SW.	May 15, 1923	120	7,000	600.00
Cranford Paving Co.....	Foot of Thirty-first Street NW.....	Feb. 1, 1923	53	.....	534.60
J. Maury Dove Co. (Inc.)	Sec. 3, structures 12 to 20, foot of Thirteenth Street SW.	Nov. 8, 1919	108	38,000	2,100.00
G. W. Forsberg.....	Sec. 2, structures 22 to 32, inclusive, foot of Eighteenth Street SW.	Mar. 14, 1922	.....	.....	733.00
Johnson & Wimsatt.....	Sec. 3, structures 5 to 11, inclusive, foot of Twelfth Street SW.	Mar. 15, 1923	190	43,500	2,244.00
Do.....	Sec. 2, structures 34 and 35, foot of Ninth Street SW.	.....do.....	80	18,000	720.00
George E. Klein.....	Sec. 2, structures 39 and 40, foot of Ninth Street SW.	Mar. 14, 1924	40	2,400	110.00
Mount Vernon & Marshall Hall Steamboat Co.....	Sec. 1, structures 59, 62, 63, and 64, foot of M Street SW.	Mar. 15, 1923	125	10,000	630.00
Norfolk & Washington Steamboat Co.....	Sec. 1, structures 60 and 65 to 72, inclusive, foot of Seventh Street SW.	Dec. 31, 1921	190	35,000	2,447.00
Potomac & Chesapeake Steamboat Co.....	Sec. 2, structures 11 to 21, inclusive, foot of Fifteenth Street SW.	Mar. 15, 1923	198	35,000	1,200.00
Wm. A. Ragan.....	Sec. 3, structures 21 and 22, foot of Thirteenth Street SW.	Mar. 15, 1921	65	4,200	100.00
Do.....	Sec. 3, structure 23, foot of Thirteenth Street SW.	May 1, 1921	18	1,440	50.00
Chas. E. Sanford et al.....	Sec. 2, structures 37, 37, and 38, foot of Ninth Street SW.	Mar. 15, 1921	44	3,320	130.00
Jos. P. Stephensen, Stephensen & Bro.	Sec. 2, structures 1 to 10, inclusive, foot of Seventh Street SW.	Jan. 31, 1922	300	59,900	2,402.00
A. M. Suit.....	Wharf site, foot of Ninth Street SW., between District sand wharf and Capital Yacht Club.	June 14, 1921	.....	.....	100.00
District of Columbia municipal fish wharf and ket.	Sec. 2, structures 78 to 82, inclusive, and 85 to 97, inclusive, structures 98 to 129, inclusive.	.....	700	152,100	.....
Do.....	Sec. 3, structures 1 to 4, inclusive, Water Street between Tenth and Twelfth Streets SW.	.....	126	11,015	.....

List of wharf property under lease June 30, 1919—Continued.

FOTOMAC RIVER FRONT—Continued.

Name of lessee.	Location.	Expires.	Water-front-age.	Area.	Rental per year.
Property yard.....	All water frontage on Water Street between H and I Streets SW.	.....	Lin. ft. 503	Sq. ft. 96,370	.....
Fire-boat wharf.....	See, 1, structures 39 and 40, Water Street between N and M Streets.	.....		
Morgue.....	See, 1, structures 41 and 42, Water Street between N and M Streets.	.....		
Harbor master's wharf.....	See, 1, structure 38, and section 2, ship between structures 41 and 42.	.....		
United States site of central heat and power plant.	Water Street between Thirteenth-and-a-half and Fourteenth Streets SW.	.....	359	38,975	.....
Do.....	Sec. 3, structures 24 to 27, inclusive, foot of Thirteenth Street SW.	.....	200	26,600	.....
Total.....	.....	.....			\$16,395.60

ANACOSTIA RIVER FRONT (EASTERN BRANCH).

Edward S. Dean.....	Water front between the lines of N Street SW.	Monthly.....	.....	\$67.50
Standard Oil Co.....	Water front between building lines of Q Street SW.	Dec. 31, 1921	.....	255.00
District of Columbia sewer division.	Foot of First Street SW., opposite left square south of square 744.	.....	330	.....
United States Superintendent of Capital Buildings and Grounds.	Foot of First Street SE., opposite square south of square 744.	.....	40	.....
Total.....	.....	.....		322.50

REPORT OF THE SUPERINTENDENT OF THE DISTRICT BUILDING.

WASHINGTON, D. C., August 19, 1919.

SIR: I have the honor to submit the following report on the "Care of the District Building" for the fiscal year ending June 30, 1919.

The routine work incident to the care of the District Building involves several distinct functions, namely, the power plant, woodworking, paint, and electrical shops; blue-print and photograph shop; printing shop; and the elevator, watch, and cleaning forces.

Power plant.—Total number of tons of coal consumed was 1,914.5, a decrease of 398.5 tons compared with the fiscal year ending June 30, 1918, due to the mild winter and to lower per cent of ash, which ran 15 per cent as compared with 20 per cent for fiscal year ending June 30, 1918. Total number of hours the heating system was in operation, 9 months 4,790 hours. Total number of hours live steam was used for heating the building 9 months 400 hours. Total number of hours ventilation, 880. Total number of hours refrigeration, 2,043. Total number of hours pneumatic-tube system was in operation, 2,172. Total number of kilowatt hours consumed 430,050. Total number of kilowatt hours used for lighting, 285,300. Total number of kilowatt hours used for power, 144,750. Total number of kilowatt hours used for elevators, 56,590. Because of shortage of labor it was necessary to discontinue operation of the power plant from 6 p. m. until 5 a. m. for a period of three months, July 1 to October 8. During this period 21,640 kilowatt hours, at \$0.025 per kilowatt hour, were purchased from the Potomac Electric Power Co. There were 742 cubic yards of ash removed at a cost of \$1,155.50. Necessary repairs to the power plant were made as follows: One set of grate bars replaced, two furnaces relined, repairs to engines, replacing of steam joint clamps and asbestos blocks, walls of engine and boiler rooms repainted. We installed one new boiler feed pump, a pneumatic tube line from the central station to room

No. 117 for use of the assessor, and new plumbing for the electrical and police departments.

Woodworking and paint shop.—This department has made general repairs to the building so far as funds would permit. There were alterations to offices, building of partitions, cutting walls, refinishing of floors, repainting of walls, and the office of the municipal garage reconstructed.

Electrical.—In this department separate lines were installed from the engine room to the health and police department print shop for supplying power. The installation of necessary switches, bus bars, and meters made it possible to determine the consumption of power, for other than lighting, by the following departments: Health department consumed 57,280 kilowatt hours; electrical department consumed 28,398 kilowatt hours; police department consumed 2,895 kilowatt hours; fire department consumed 770 kilowatt hours; making a total of 89,343 kilowatt hours consumed by these departments; 30 lighting fixtures have been changed from the direct to the semidirect; elevators, electric fans, lighting, and batteries for the municipal garage as well as the District Building were efficiently cared for.

Print shop.—Six hundred and one orders for the various departments, totaling 1,258,071 pieces of printed matter, were completed, together with cutting, stitching, stapling, and padding, at a total cost of \$8,724.28, an increase of \$3,951.77, as compared with the fiscal year ending June 30, 1918.

Blue-print and photograph shop.—Thirty-two thousand and ninety-nine square feet of blue printing were completed at a cost of \$1,022.93. Six hundred and thirty-one photographs were completed at a cost of \$250.64, making a total of \$1,273.57.

F. S. BESSON.

*Captain, Corps of Engineers, United States Army,
Superintendent.*

To the COMMISSIONERS OF THE DISTRICT OF COLUMBIA
(Through the Engineer Commissioner).

REPORT OF THE BOARD FOR THE CONDEMNATION OF INSANITARY BUILDINGS.

WASHINGTON, October 7, 1919.

GENTLEMEN: We have the honor to submit the following report for the year ended June 30, 1919.

Buildings on which action was taken in response to notices served under the act creating the Board for the Condemnation of Insanitary Buildings during the year ended June 30, 1919:

	Examined.	Demolished.	Repaired	No action necessary.	Value of repairs.	Pending.
Buildings in streets.....	210	60	43	75	\$11,850	12
Buildings in alleys.....	116	32	23	61	3,900	20
Buildings condemned under section 16 of building code:						
Buildings in streets.....	15	11				4
Buildings in alleys.....	15	13				2
Total.....	356	116	66	136	15,750	33

Buildings acted upon since the creation of the Board for the Condemnation of Insanitary Buildings up to and including June 30, 1919.

	Examined.	Demolished.	Repaired.	No action necessary.	Estimated value repairs during fiscal year 1918-19.
Buildings in streets.....	3,180	1,529	1,154	421	\$18,950
Buildings in alleys.....	4,104	736	546	2,802	4,075
Total.....	7,284	2,265	1,700	3,223	23,025

Number of meetings of the Board for the Condemnation of Insanitary Buildings during the year ended June 30, 1919-----	9
Number of preliminary notices served for the year ended June 30, 1919-----	84
Condemnation notices served-----	29
Condemnation notices affixed to buildings-----	35
Condemnation notices served under section 16 of the building code-----	40
Inspections and miscellaneous visits made in connection with the service of notices-----	2,385
Estimated number of tenants required to secure other living quarters through action on the part of the Board for the Condemnation of Insanitary Buildings since the creation of the board-----	6,510
Estimated number of tenants benefited by repairs for the year ended June 30, 1919-----	330
Estimated number of tenants benefited by repairs since the creation of the board-----	5,796
Estimated value of repairs required through action on the part of the Board for the Condemnation of Insanitary Buildings for the year ended June 30, 1919-----	\$15,750

The act of Congress approved September 25, 1914, declaring the use or occupation of any building or other structure erected or placed on or along any alley as a dwelling or residence or place of abode by any person or persons is injurious to life, to public health, morals, safety, and welfare of the District of Columbia; and such use or occupation of any such building or other structure on, from and after the 1st day of July, 1918, shall be unlawful; was amended by an act of Congress approved May 23, 1918, which amendment provides, "That the operation of the second paragraph of section 1 (relating to the use or occupation of alley buildings as dwellings) * * * in the same hereby is postponed until the expiration of one year following the date of the proclamation by the President of the exchange of the ratifications of the treaty of peace between the United States and the Imperial German Government."

There is being made at this time a careful study of conditions in the alleys of the city, and a census is being taken of the inhabitants of the same; an inspection and enumeration is also being made of the alley buildings; this survey of the alleys' conditions and buildings is being made with the view of correctly determining the number of dwellings now occupied as such, and the number of alley dwellers, also the number of alley dwellings demolished or converted to some other use since the creation of the Board for the Condemnation of Insanitary Buildings; also to determine the feasibility of extending some of the existing 30-foot alleys now used for dwellings to the abutting streets making minor streets of the same.

Attention is invited to the item of repairs to alley dwellings; the greater part of these repairs consisted of converting alley dwellings into garages, thereby increasing the rental value of the same.

CAREY H. BROWN,
Captain, Corps of Engineers, United States Army,
Assistant to the Engineer Commissioner.
 W. C. FOWLER, M. D.,
Health Officer, District of Columbia.
 JOHN P. HEALY,
Inspector of Buildings, District of Columbia,
Board for the Condemnation of Insanitary Buildings.

To the COMMISSIONERS OF THE DISTRICT OF COLUMBIA.

APPENDIX.

SPECIFICATIONS FOR PAVING STREETS AND AVENUES WITH SHEET ASPHALT AND CONSTRUCTING CEMENT CONCRETE ROADWAYS.

SHEET ASPHALT.

1. *Work*.—The work to be done under this proposal and contract will consist of paving with sheet asphalt the streets, avenues, and roads named in paragraph 2, or parts thereof, or doing any portion of such work, as may be ordered in writing by the Commissioners of the District of Columbia.

2. *Amounts*.—The streets and avenues expected to be so improved and the approximate quantities of work of each are as follows: (On file in office of Engineer Commissioner, District of Columbia.)

The bidder may state the period following the award of contract within which work will be commenced, otherwise it will be 30 days.

The order of work on the streets, roads, and avenues named will be as directed by the Engineer Commissioner.

The work must be so conducted that the entire work will be completed before July 1, 1920; unless otherwise authorized by the Engineer Commissioner.

Bids will be scheduled on the basis of the prices named for pavements with a 6-inch concrete base, but the prices named for a 5-inch base will be incorporated in the contract and such work as may be so directed will be executed and paid for as such.

3. *Bids*.—The contractor will, for the prices bid, do all the work prescribed in these specifications; do all the necessary grading and trimming of the roadbed and all rolling; provide bridges, fences, and other means of maintaining travel on intersecting streets, roads, and railroads, and all private driveways after giving due notice to parties affected thereby; maintain the same in good and safe condition as long as may be necessary, and then remove such temporary expedients and restore such roads to their proper condition; provide watchmen, lights, fences, and other precautionary measures necessary to the protection of person and property; furnish all materials (except as specified) and all tools and implements, labor and transportation required to lay and put in complete order for use the specified pavement; and do each and all of these to the satisfaction of the engineer. Upon the completion of the work he will remove any temporary structures erected during the progress of the work, and restore all fixtures, pavements and parkings, both public and private, to satisfactory condition.

4. *Old material*.—Old material removed from the streets will be the property of the District of Columbia, and the work of removal will be paid for at prices named in paragraph 14 of these specifications. Granite blocks, cobble, old curb, etc., must be removed to the nearest property yard or to such other places as the engineer may direct.

5. *Grading and subgrade*.—Lines and grades will be established by the engineer, and no work will be commenced until these are given. The area over which the pavement is to be laid must be excavated to the proper depth below the surface of the pavement when completed, any objectionable or unsuitable matter below the bed being removed to such depth as may be directed by the engineer and the space filled with suitable material thoroughly compacted. The bed, after being trimmed so as to be parallel to the surface of the pavement when completed, will be thoroughly compacted by rolling, with a roller weighing not less than 5 tons, and by heavy ramming at places which can not be reached by the roller, dampening the bed before rolling and ramming, if required, to

the satisfaction of the engineer. No extra allowance will be made for trimming or rolling, but the volume of earth, etc., removed will be paid for as grading of its class. Any filling will be done in layers not exceeding twelve (12) inches in thickness, and all materials used for this purpose will be subject to approval. If improper or unsuitable material be used, it will be removed at the cost of the contractor. All measurements will be made in place, and payments made thereon. Should the grading involve work in both "cut" and "fill," the measurement of it will be computed on the basis of the volume of the material in place in the "cut" only; the excavated material from the "cut" section deposited in the "fill" will not be again paid for as "fill." Should the amount of cut on the street not suffice to make the necessary fill, the amount borrowed from other designated localities will be paid for as grading.

6. *Six-inch concrete base.*—Upon the bed prepared as described in paragraph 5, there will be laid 6-inch foundations of concrete as directed, made of the following materials by volume: 1 part Portland cement, 3 parts sand, 7 parts gravel.

Broken stone, run of the crusher, may be substituted for part or all of the gravel at the option of the contractor.

(a) *Cement.*—The cement used will be a standard brand of Portland cement, uninjured by age or exposure, and delivered at the work in original undamaged packages. The right is reserved to reject any cement that has not established itself as a high-grade Portland cement and has not been made by the same mill for two years and given satisfaction in use for at least one year under climatic and other conditions of at least equal severity as those of the work proposed. The contractor shall keep the cement in store, under proper cover, in the city of Washington, and shall properly protect it until used. The engineer shall have the right to test the cement as he judges necessary and to reject any or all lots. The cement, after being accepted, can not be transferred or used by the contractor on other work without the consent of the Engineer Commissioner. The cement while in storage or upon the work or while being hauled upon the work, shall be properly protected, and no cement shall be used which, in the opinion of the engineer, has been injured by age or exposure.

No cement shall be used upon the work until it has been tested in the office of the Engineer Commissioner and accepted by him, the tests to extend over such length of time, not exceeding 28 days, as the Engineer Commissioner may think necessary.

Cement furnished by the contractor that has been tested and accepted by the Bureau of Standards, and that is identified as such, will be subject only to the following retests by the District of Columbia: Firmness, initial set, hard set, 24-hour tensile.

(b) *Sand.*—The sand used shall be clean, sharp, river or pit sand, containing both fine and coarse grains, but free from sewage, mud, clay, mica, paper, leaves, chips, or other foreign matter, and not showing when shaken with water and after subsidence, more than 5 per cent by volume, of silt.

(c) *Broken stone.*—Stone used in concrete must be hard, durable, and properly broken to a size small enough to pass through a ring 2 inches in diameter when the run of the crusher is substituted for gravel. The run of the crusher shall not contain over 1 per cent of material passing a No. 10 sieve. The stone shall be thoroughly cleansed from all foreign substance, and shall be screened and washed, if so ordered by the engineer. Sand, detritus, or any material other than hard, angular fragments of stone will be considered foreign substances.

(d) *Gravel.*—Gravel shall be clean, washed gravel, and shall not contain pebbles greater than 2 inches in their largest dimensions, and shall run from that down to pea size, well graduated.

(e) *Water.*—Water used for mortar and concrete shall be fresh and clean, free from earth, dirt, or sewage and shall be used in such quantity as the engineer may direct.

(f) *Platforms.*—Platforms shall be provided if so ordered by the engineer upon which all sand, gravel, and broken stone for concrete shall be placed when brought upon the line of work, and kept there until used.

(g) *Mixing.*—The thorough mixing and incorporation of all material will be insisted upon. If done by hand labor the dry cement and sand shall be turned over and mixed with shovels by skilled workmen not less than six times before the water is added; the stone or gravel, after being drenched with water shall be added to the mixed sand and cement; the drenching shall not be done while the stone or gravel is in the wheelbarrow; the whole mass shall be thoroughly

turned over with shovels, not less than four times, and mixed upon a water-tight platform until every particle of stone or gravel is completely enveloped with mortar. The whole operation of mixing and laying each batch shall be performed as expeditiously as possible, by the aid of machinery, or a sufficient number of skilled men. If the concrete is mixed in batches requiring one barrel of cement, the platform must not be smaller than 10 by 12 feet, nor will a larger amount of concrete than can be made with one barrel of cement be allowed to be mixed in one batch by hand. In mixing by machinery the materials must be so delivered as to insure a uniform product of the specified proportions of all ingredients to the satisfaction of the engineer, and for this purpose the mixer shall be revolved for at least one minute for each batch.

(h) *Setting*.—Concrete shall not be used after it has begun to show evidence of setting. No concrete which has once set shall be used as material for mixing a new batch.

Each batch of concrete after being mixed shall be spread in place in horizontal layers by means of shovels so as to give the requisite thickness after being tamped and shall then be thoroughly compacted. Any evidence of lack of compaction will be regarded as sufficient reasons for removal and replacement of the base. Hauling over base less than three days old will not be allowed unless planks are laid.

7. *Five-inch concrete base*.—All provisions of the specifications for a 6-inch concrete base shall apply to a 5-inch concrete base which shall differ from the 6-inch base only in respect to the thickness thereof and the price paid therefor.

SHEET-ASPHALT PAVEMENT.

8. *Asphalt binder*.—The binder course shall be composed of broken stone, equal in quality to the stone specified for concrete base, its largest dimension passing an inch-and-a-quarter screen, and the stone, after passing the heating drums, shall not contain less than 5 nor more than 15 per cent of material passing a No. 10 screen.

The stone will be heated not higher than 350° F., in suitable appliances. It is then to be thoroughly mixed by machinery with asphalt cement, such as is acceptable for surface cement, penetration 50 to 80, at such temperature and in such proportions that the resulting binder will have life and gloss without an excess of cement. Should it appear dull from overheating or lack of cement, it will be rejected. While hot it will be hauled upon the work, spread upon the base so that when compacted it will be at least 1½ inches in thickness, and immediately rammed and rolled until it is cold. Should the resulting course not show a proper bond, it must be immediately removed and replaced by and at the expense of the contractor. Binder and top shall not be taken from the yard to the site of the work, when in the judgment of the engineer, weather conditions are unsuitable for the work of laying the pavement.

The contractor shall not enter upon a concrete base in order to lay the binder course until it has obtained sufficient strength for such a purpose, and during the period between laying the base and binder he shall properly protect it, and, when ordered by the engineer, shall sprinkle it in warm weather between the hours of sunrise and sunset as often as may be necessary, and in cold weather cover it with a material suitable for its protection.

9. *Asphalt wearing surface*.—The wearing surface of the pavement shall be composed of asphalt cement (refined asphalt and asphaltic flux), clean, sharp-grained sand, fine absorbent mineral dust.

(a). *Asphalt*.—The asphalt shall be refined until homogeneous and free from water and shall not at any time be heated to a temperature high enough to injure it, and 100 parts of the refined product shall require not more than 30 parts of flux to produce the asphalt cement described in paragraph 9-c.

The asphalt for class (a) work shall conform to such tests as will establish its identity as a product of the refinement of a natural crude asphalt without the admixture of any other material.

The refined asphalt for class (b) work shall be the product of refinement of an unadulterated natural asphaltic oil, and shall contain, after refinement, not less than 90 per cent of bitumen soluble in carbon bisulphide.

(b). *Asphaltic flux*.—The flux used in the manufacture of asphalt cement shall be an asphalt oil from which the lighter oils have been removed by distillation without cracking, until the flux has the following characteristics:

Free from water and foreign matter.

Flash point, not less than 300° F.

Distillate at 400° for 18 hours, less than 10 per cent.

The flash point shall be taken in New York State closed oil tester.

The distillate shall be made with about 50 grams of flux in a small glass retort, provided with a thermometer and placed in a copper holder. The residue in the retort, after distilling, must be free from coke.

Any other softening agents approved by the engineer commissioner may be used in place of asphaltic flux.

(e) *Asphalt cement.*—The asphalt cement must be of refined asphalt, fluxed when necessary with asphaltic oil, refined maltha, or other approved flux. The cement must be practically free from water and must be within the range of 40 to 70 penetration when tested at 77° F. on Dow penetration machine with No. 2 needle, 100 grams, 5 seconds. The degree of penetration to be fixed by the engineer commissioner.

Preference will be given to an asphalt cement that is not readily affected by water, provided it is satisfactory in other respects. The use of an asphalt under these specifications shall be subject to the approval of the engineer commissioner, and if an asphalt has been proposed for use by the contractor and approved by the engineer commissioner, no change in the asphalt to be used shall be made unless with the approval of the engineer commission. If an asphalt or flux is submitted for use which has not been successfully used for a period of at least two years for paving under conditions similar to those existing in the District of Columbia, its use may be limited to such extent as may be deemed advisable, or it may be rejected for use entirely in the discretion of the engineer commissioner.

The asphalt cement must comply with the following tests:

1. It must be of such consistency that when tested at 32° F. it will not show a hardness below 10 penetration, and when tested at 115° F. it will not be softer than 350 penetration.

2. When a briquet of the cement having a minimum cross section of one square centimeter, having a penetration of 50°—53° at 77° F. is tested for ductility at 77° F., the bitumen must stretch at the rate of 5 centimeters per minute to a distance of 25 centimeters before breaking.

3. When the cement is heated in an open tin box $\frac{3}{4}$ inch deep by $2\frac{1}{2}$ inches in diameter at a temperature of 300° F. for seven hours in a hot-air oven it must not show a loss by volatilization of over 5 per cent and must not have been hardened over 30 per cent by this heating.

The asphalt cement must never be heated to a temperature that will injure it.

When the asphalt cement contains over 5 per cent of material that will separate by subsidence while in molten condition it must be thoroughly agitated before drawing from storage and while in use in the supply kettles so as to insure a uniform cement.

These properties shall be determined by tests made by uniform methods, as adopted in the office of the engineer commissioner.

(d) *Sand.*—The sand to be used shall be free from mud, hard grained, and moderately sharp. On sifting it should have at least 15 per cent of material that would be caught on a 40 mesh per inch screen, 25 per cent of material that will pass an 80 mesh to an inch screen, and 10 per cent, at least, must pass a 100 mesh to an inch screen. If the sand to be used does not contain the desired fine material, mineral dust may be added to make up the deficiency, and in any case at least 5 per cent of such mineral dust shall be used. The amount of fine material may be increased at the discretion of the engineer commissioner.

(e) *Mineral dust.*—This shall be any fine Portland cement or limestone dust, the whole of which shall pass a 30-mesh screen, and at least 85 per cent pass a 100-mesh screen.

(f) *Asphalt paring material.*—The materials complying with the above specifications shall be mixed in proportion by weight, depending upon their character and the traffic on the street, and upon the character of the asphalt, and will be determined by the engineer commissioner, but the percentage of bitumen in any mixture soluble in carbon bisulphide shall not be less than 9 nor more than 13 per cent. If the proportions of the mixture are varied in any manner from those specified, the mixture will be condemned; its use will not be permitted; and, if already placed on the streets, it must be removed and replaced by proper materials at the expense of the contractor.

The sand or the mixture of sand and stone dust, and the asphalt cement, will be heated separately to about 300° F. The dust, if limestone, will be mixed while cold with the hot sand in the required proportions, and then mixed with the asphalt cement at the required temperature, and in the proper proportion

in a suitable apparatus, so as to affect a thoroughly homogenous mixture. Sand boxes and asphalt gauges will be weighed in the presence of inspectors as often as may be desired.

Samples of all material entering into the composition of the pavement shall be supplied to the inspector of asphalt and cements when required, in suitable tin boxes and cans; he shall have access to all branches of the works at any time, and shall have the right to obtain samples of all materials from the source of supply.

(g) *Laying asphalt surface.*—The asphalt paving mixture, prepared in the manner described, will be hauled to the site of the work at a temperature of not less than 250° or more than 350° F. in trucks or wagons, canvas covers being provided for use in transit. It will then be shoveled into place and thoroughly spread to a thickness of at least $2\frac{1}{2}$ inches by means of hot-iron rakes, in such manner as to give uniform and regular grade, so that, after having received its ultimate compression, it will have a net thickness of at least $1\frac{1}{2}$ inches. This depth will be constantly tested by means of gauges furnished by the engineer commissioner. The surface will then be compressed by steam rollers. First with a roller weighing not less than $2\frac{1}{2}$ tons, after which a small amount of hydraulic cement will be swept over it and will then be thoroughly compressed by a steam roller weighing not less than 10 tons, the rolling being continued for not less than five hours for every 1,000 yards of surface. The street to be barricaded, the barricades to remain for such length of time as deemed necessary by the engineer commissioner. Binder or topping shall not be laid when, in the judgment of the engineer, weather conditions are unsuitable for the work of laying the pavement. The surfaces on which they are laid must be cleaned to the satisfaction of the engineer so that good adhesion of the binder to the base and of top mixture to the binder may be secured.

10. *Laying vitrified blocks.*—Vitrified-block gutters will ordinarily be $13\frac{1}{2}$ inches wide, laid on a concrete base 6 inches in depth, of the same material and proportions and laid in the same manner as prescribed in these specifications for the concrete base under asphalt pavements.

As soon as practicable after the base concrete has been laid, a dry mixtrue, composed of four parts of the sand specified in paragraph 6 (b), and one part of Portland cement, thoroughly mixed, will be spread thereon to the depth of not less than one-half inch, as a bed for the paving blocks, and regulated so as to be exactly parallel to the finished grade of the gutter.

On the bed thus prepared for them the blocks will be set on edge, with the longest dimensions at right angles to the curb, or as directed by the engineer.

The longitudinal joints of each course of blocks laid must be broken by a lap of not less than 4 inches.

The blocks will then be carefully rammed by placing a plank over several courses and ramming the plank with a heavy rammer. The ramming will be continued until the blocks reach a firm, unyielding bed and present a uniform surface, with proper grade. Any lack of uniformity in the surface or defect in the grade must be corrected by taking up and relaying the blocks.

After proper ramming the entire gutter will be thoroughly grouted with a thin, easily flowing grout, of neat Portland cement.

A similar construction of block to that described for gutters may be used adjacent to railroad tracks; the base will in that case extend to the bottom of the crossties, or at least 6 inches thick.

The blocks will be furnished the contractor at the District property yards, and must be hauled to the work at his expense.

11. *Additional work.*—The following specifications will cover incidental work which may be required of the contractor:

(a) *Setting 6-inch by 20-inch granite and bluestone curb.*—This curb will be set in the following manner: A trench parallel to the curb line, having a depth of 24 inches below the top of the curb when set, and 20 inches wide, will be excavated to receive the curb and its gravel bed; the dimensions of the trench, in width, will be 14 inches from the curb line toward the building line of the street, and 6 inches from said curb line toward the center line of the street. In the trench thus prepared the curb will be set, and brought to line and grade, with plumb face. Spalls of stone, hard-burned brick or other acceptable substance prepared for the purpose, will be used to adjust the curb to grade, and these spalls will be so placed and adjusted as to support the curbing permanently, and afford a firm and stable support for it, without the use of small chips and fragments, used as "shimming" pieces, to wedge the stone in place.

After the curb has been properly placed and adjusted to line and grade, the trench will be filled with gravel of approved quality, to within 8 inches of the top of the curb, the filling to be done in layers of not more than 3 inches in depth, and thoroughly compacted by a suitable ramming. Close contact joints and even surfaces must be made, and the lines and grades furnished strictly followed.

(b) *Setting 8-inch by 8-inch granite curb.*—This curb will be set in the following manner: A trench parallel to the curb line, having a depth of 15 inches below the top of the curb when set, and 18 inches wide, will be excavated to receive the concrete and the curb. The dimensions of the trench in width will be 14 inches from the curb line toward the building and 4 inches from the curb line toward the center line of the street. In this trench thus prepared a bed of concrete, composed of 1 part Portland cement, 4 parts of clean concrete sand, and 10 parts of screen pebbles, will be laid, filling the trench to a depth of 5 inches, the material to be mixed and laid under the same conditions as prescribed for laying cement concrete base for sheet asphalt pavements. On the base prepared and laid as above, the curb will be placed before the concrete has set, and adjusted to line and grade by setting it to a firm, unyielding bearing in a bed of freshly made concrete, by the use of heavy wooden mauls. The face of the curb must be plumb and true to line, and the top of it carefully set to grade with close and even contact joints. After the curb has been set to line and grade, the trench on the footwalk side will be immediately filled with concrete to within 5 inches of the top of the curb, which will be thoroughly rammed and compacted, after which it will immediately be covered with earth to prevent injury to it through too rapid evaporation, etc. In case vitrified-block gutters are to be laid in front of the curb, any portion of the concrete base of the curb that would interfere with the laying of such gutters must be removed immediately after the curb is set.

(c) *Resetting 6-inch by 20-inch granite and bluestone curb.*—The work to be done under this classification is identical with that specified for setting this class of curb, except no hauling of curb is required other than that incidental to the necessary disposition of it upon the line of the work. Under this classification also, the curb may be adjusted to line and grade without removing it from its trench, if so ordered by the engineer.

(d) *Resetting 8-inch by 8-inch granite curb.*—The work to be done under this classification is identical with that specified for setting this class of curb, except that no hauling of the curb is required other than that incidental to the necessary disposition of it upon the line of work, and no new concrete is required other than that sufficient to imbed the stone and back and adjust it to line and grade.

(e) *General instructions.*—All curb will be furnished to the contractor at the District property yard, and will be hauled by him to the site of the work; any curbing unaccounted for, or improperly disposed of, or damaged or broken, through careless or unskilled handling, will be charged against him, the value of the loss to the District will be deducted from any amount due the contractor for work done, as determined by the engineer.

All expenses connected with or incidental to the work of setting or resetting curb, as described above, including the hauling of the curbing, preparing the curb trenches, and the necessary grading connected therewith, furnishing gravel and spalls, furnishing and placing concrete, and all other material and labor necessary to execute the work in accordance with the specifications therefor, are included in the fixed price for the respective items as hereinafter stated. The cost of dressing, jointing, or cutting the curb will be paid for additionally, but no other claim for additional compensation will be entertained. Should the adjoining brick footwalks be disturbed in order to set or reset the curb the portion so disturbed shall be repaved, if required by the engineer, without cost to the District.

12. *Prices for additional work.*—Contractors must do such additional work incident to the construction of new pavements as may be ordered on each street by the Engineer Commissioner. All such work shall be in accordance with current District specifications. Prices paid for this work will be as stated below:

1. Removing old curb, including haul, not to exceed 2 miles, 15 cents per linear foot.
2. Hauling same beyond distance of 2 miles, 1½ cents per linear foot per mile.

3. Hauling from District property yard and setting 6-inch by 20-inch curb, 44 cents per linear foot.
4. Resetting 6-inch by 20-inch granite and bluestone curb, 40 cents per linear foot.
5. Hauling from District property yard and setting 8-inch by 8-inch curb, 58 cents per linear foot.
6. Resetting 8-inch by 8-inch curb on new concrete base, 50 cents per linear foot.
7. Resetting 8-inch by 8-inch curb on old concrete base, 30 cents per linear foot.
8. Dressing, jointing, and cutting curb, etc. (stonecutter's time), including setting-up labor, \$1 per hour.
9. Removing old rubble, cobble, flagging stone, and brick, vitrified block, or brick, etc., including haul not to exceed 2 miles, 30 cents per square yard.
10. Removing old asphalt blocks, including haul not to exceed 2 miles, 32 cents per square yard.
11. Removing old granite block, including haul not to exceed 2 miles, and removal of old paving bed and cleaning concrete base where same exists, 45 cents per square yard.
12. Overhaul on items 9, 10, and 11, $2\frac{1}{2}$ cents per square yard per quarter mile or fraction thereof.
13. Removing old coal-tar or asphalt surface and binder from concrete base in connection with resurfacing work, including haul not to exceed 2 miles, 20 cents per square yard.
14. Grading and hauling earth, not to exceed 1,000 feet, \$1 per cubic yard.
15. Grading and hauling macadam not to exceed 1,000 feet, \$1 per cubic yard.
16. Removing old coal-tar and bituminous pavements or base of the class laid since 1880, and hauling not to exceed 1,000 feet, \$1.70 per cubic yard.
17. Removing old coal-tar and bituminous pavement or base of the class laid prior to 1880 and hauling same not to exceed 1,000 feet, \$3.20 per cubic yard.
18. Removing old concrete base and hauling not to exceed 1,000 feet, \$2.60 per cubic yard.
19. Hauling excavated material per 100 feet over first 1,000 feet, $1\frac{1}{2}$ cents per cubic yard.
20. Laying or relaying vitrified brick or block on old concrete base, \$2 per square yard.
21. Laying or relaying asphalt block and vitrified brick or block on gravel base, 6 cents per square yard.
22. Cleaning old vitrified brick or block for relaying, 45 cents per square yard.
23. Laying and relaying granite block, \$1.10 per square yard.
24. Relaying cobble and rubble, 45 cents per square yard.
25. Repairing cement walks, including haul, \$2.50 per square yard.
26. Repairing brick walks, 40 cents per square yard.
27. Laying Portland cement concrete base in place, \$8 per cubic yard.
28. Adjusting man hole tops and basin covers to grade, \$2 each.
29. Adjusting water-valve casings to grade, \$4 each.
30. Asphaltic top, 75 cents per cubic foot.
31. Asphaltic top, 43 cents per cubic foot.
32. Adjusting electric-light or telephone manhole tops to grade, as follows:
 - (a) Size, less than 6 square feet area, \$2 each.
 - (b) Size, over 6 and less than 16 square feet, \$4.50 each.
 - (c) Size, from 16 to 28 square feet, \$7.50 each.

13. *Extra work.*—The contractor must be prepared to do any extra work that may be ordered in writing by the engineer, and for this he will be paid at current rates for work of a similar character, or, if the extra work should be of a class for which no rate is fixed by current contracts, the actual reasonable cost to the contractor, as determined by the engineer, plus 15 per cent of said cost.

The contractor shall have no claim for compensation for extra work unless same is ordered in writing by the engineer. All additional and extra work shall conform to current District of Columbia specifications therefor.

14. *Guaranty.*—All work under this contract will be guaranteed and kept in repair by the contractor without cost of the District of Columbia for a period of one year from date of its completion as indicated on the final voucher for each street.

It is further expressly understood and agreed that if any of the pavements laid should, for any reason whatsoever, within the period of one year, prove inferior to the best laid in the District prior to July 1, 1917, then the contractor shall, on demand of the commissioners, remove such defective pavements and relay them with new material of approved quality. The engineer commissioner shall decide the question of inferiority.

On expiration of guaranty for maintenance the work is to be inspected, and all imperfections must be corrected where and to such extent as the engineer shall direct, upon which the engineer will accept the same in writing, and until such acceptance the guarantee shall be in force. Repairs that may become necessary during the guarantee period will be made by the contractor when ordered by the engineer commissioner.

If the contractor fails to make necessary repairs after notice to do so, the commissioners may cause such work to be done and the contractor and the surety under the bond shall be jointly and severally liable for the cost of same.

15. *Cuts.*—Contractors shall be responsible for any work done upon any street over plumbers' cuts or other work done by the permission of the commissioners before the work is begun.

16. *Modification.*—The commissioners reserve the right to modify these specifications as may from time to time seem desirable. The amount of compensation, if any, due the contractor for said modifications will be determined by the engineer commissioner on the same basis as in the case of extra work.

17. *Constructing cement curb, gutters, and cement roadways.*—All work of constructing cement curb, gutters, and cement roadways, will be done in accordance with the following specifications, and shall conform to the drawing of same on file in the office of the engineer of highways.

18. *Cement.*—The District will furnish to the contractor all Portland cement necessary for this work, from the stock on hand at its warehouse at Fourteenth and D Streets SW., and will charge said contractor with the cost of same at the rate of \$2.75 per barrel of cement for each and every barrel so furnished; and will collect the amount due therefor from any moneys found to be due to said contractor by the District. Where said cement is furnished in bags, the bags shall be returned to the District warehouse by the contractor to whom the cement is furnished; and upon failure to return said bags in good condition an additional charge shall be made against the contractor at the rate of 25 cents for each bag not so returned. Four bags containing 3.8 cubic feet of cement weighing 100 pounds per cubic foot shall constitute a barrel of cement under these specifications.

19. *Sand.*—The sand used shall be equal to what is known locally as best well graded Potomac River concrete sand. It shall be clean and free from injurious soft particles or organic matter.

20. *Gravel.*—The gravel shall be equal to what is known locally as best well graded Potomac River 1½-inch washed gravel. It shall be clean and free from objectionable matter.

21. *Sand screens.*—Sand used for surface layer must be screened on the line of work; screens to be used for this purpose to be designated by the engineer.

22. *Measurement of aggregates.*—Sand and gravel for concrete or mortar shall be carefully measured. The quantities for each batch shall be exactly sufficient to be used with either one, two, or three sacks of cement, and not fractional sacks.

23. *Storing aggregates.*—Sand and gravel shall be kept clean. Delivery on the subgrade will not be permitted prior to rolling as stipulated in paragraph 75. When aggregates are deposited directly on the subgrade, care shall be taken when shoveling the aggregates for use, that no clay or earth is taken.

24. *Water.*—The amount of water used in mixing shall be the minimum quantity which will produce a workable concrete suitable for the purpose specified. Water used shall be clean and free from oil, acid, alkali or vegetable matter.

25. *Mortar.*—Mortar shall be composed of cement and sand in proportions specified. The mixtures are intended to secure a mortar in which every particle of sand is enveloped by cement, and this result must be obtained to the

satisfaction of the engineer. If the mixing be by hand, it shall be done on a water-tight platform with tight raised edges. Mixing may be done by the use of an approved machine. No batch shall contain more than one barrel of cement.

26. *Concrete mixed by hand.*—If the mixing be by hand, it shall be done on a water-tight platform with tight raised edges. The aggregate shall be spread over the mortar made as above directed. The aggregate shall be thoroughly drenched with water just before it is added to the mortar. The drenching shall not be done in the barrow, nor otherwise to permit the addition of free water to the mortar. Each batch of concrete shall be thoroughly mixed until each piece of aggregate is wholly coated with mortar and in a manner satisfactory to the engineer.

27. *Concrete mixed by machine.*—A batch mixer of approved type shall be used and it shall be equipped with a device for measuring water and another one for mechanically preventing emptying of the mix, until all the materials have been mixed a minimum time of one minute. During this period the drum shall make not less than 12 nor more than 18 revolutions per minute. The entire contents shall be removed from the drum before materials are placed therein for the succeeding batch.

28. *Retempering.*—Retempering of mortar or concrete which has partially hardened, that is, the mixing of this mortar or concrete with additional materials or water, shall be prohibited.

29. *Concrete for cement curb.*—Concrete for curb shall be composed of 1 part cement, 2 parts sand, and 4 parts of gravel. Should the contractor so desire, he will be permitted to substitute broken stone for the gravel used in this concrete. Such stone must be hard, durable, and properly broken to a size small enough to pass through a ring 2 inches in diameter; and the size, quality, and grading must be approved by the engineer. It shall be free from foreign substances as provided for gravel.

30. *Subgrade for curb.*—The space over which the cement curb is laid is to be excavated and trimmed to a depth of at least 14 inches below the finished grade and for the full width of the curb. In the trench thus prepared a bed of bank gravel or coarse hard cinders will be spread to a depth of 6 inches and thoroughly rammed. The gravel must be free from an excess of clay or loam and must be approved by the engineer.

31. *Curb.*—The curb shall be cut in lengths of about 10 feet. The top shall be finished with 1 inch of cement mortar, composed of 1 part cement to 2 parts sand. Forms must be put up for this curb and removed when the concrete has sufficiently set; and the face and top surface of the curb troweled or rubbed to a neat finish. Cement curb shall be constructed as shown in drawings on file in the office of the engineer of highways. The space at back of curb is to be filled with earth up to the level of the curb for not less than 1 foot in width.

32. *Mortar and surface for sidewalk repair.*—Mortar for the surface layer of sidewalks shall be made of the specified cement and sand, mixed in the manner specified above in the proportion of 2 to 3, by volume. The mortar shall be spread while fresh upon the concrete base while the latter is still soft and adhesive and before it shall have reached its first set, in such quantity that after thorough manipulation it shall be 1 inch in thickness. It is then to be leveled off and beaten with wooden battens, so as to break any air cells and make the surfacing perfectly solid and at the true grade. No work marked by sand which has been spread over it for protection will be accepted.

33. *Dry coat for sidewalk repair.*—A coating of dry cement and fine sand in equal proportions, by volume, and such part and kind of coloring matter as the engineer may direct thoroughly mixed, is then to be floated into the layer; and by skillful use of tools the surface is to be made smooth. The joints of the blocks will then be made to a depth of one-half inch immediately over the joints in the concrete base and the blocks brought to a true line and grade and finished with trowels to the satisfaction of the engineer. Any lack of adhesion between the concrete and mortar layers shall be sufficient reason for requiring entire removal and substitution of new and satisfactory work.

34. *Grading for roadways.*—The area over which a pavement is to be laid must be graded to the proper depth below the surface of the pavement when completed, any objectionable or unsuitable matter below the bed being removed to such depth as may be directed by the engineer and the space filled with

suitable material thoroughly compacted. The bed, after being trimmed so as to be parallel to the surface of the pavement when completed, will be thoroughly compacted by rolling, with a roller weighing not less than 5 tons and by heavy ramming at places which can not be reached by the roller; dampening the bed before rolling and ramming, if required, to the satisfaction of the engineer. No extra allowance will be made for trimming or rolling, but the volume of earth, etc., removed will be paid for as grading. The rolling of the subgrade for both macadam and concrete roadways is to be done by the roadway contractor in connection with the grading, and no additional compensation for this rolling will be allowed.

35. *Maintenance of subgrade*.—If hauling over the subgrade after rolling results in cuts or other objectionable irregularities, the contractor shall reroll the subgrade before surfacing. Tamping in such cases instead of rerolling is to be prohibited. Immediately before placing roadway paving the subgrade shall be tested for elevation and corrected if above grade as much as one-eighth inch.

CEMENT CONCRETE ROADWAY.

36. *Composition*.—Cement concrete roadway shall be composed of 1 part of the specified cement, 2 parts sand and 3 parts gravel, laid upon the prepared subgrade to a thickness of 6 inches. Broken stone, as specified herein in paragraph 70, for cement curb and gutter, may be substituted for part of or all of the gravel at the option of the contractor.

37. *Laying concrete*.—The concrete shall be deposited on the moist subgrade in successive batches, continuously between transverse joints for the full width of the road.

38. *Transverse joints*.—Contraction or expansion joints except as provided for in paragraph 80 will not be required.

39. *Joints at the close of day's work*.—At the close of each day's work and also when the process of depositing concrete is stopped for a length of time such that in the opinion of the engineer the concrete has taken its initial set, a butt construction joint shall be made perpendicular to the center line of the pavement. For this joint there shall be used a clean plank having a thickness of not less than 2 inches. Upon the resumption of work the plank shall be carefully removed and the fresh concrete deposited against the old in such manner as to avoid injury to the edge of the old concrete.

40. *Finishing concrete*.—The surface of the concrete shall be struck off by means of templates, moved with a crosswise motion. The concrete having been brought to surface grade, men will not be permitted to stand on boards, placed thereon, in order to carry on the work.

41. *Rolling*.—Immediately after the concrete has been struck off, it shall be rolled with an approved metal hand roller, having a smooth even surface approximately 6 feet in length, not less than 8 inches or more than 12 inches in diameter. An 8-inch roller shall weigh not more than 12 pounds per lineal foot and a 12-inch roller not more than 15 pounds per lineal foot. The roller shall be moved very slowly over the surface of the concrete with a crosswise motion so as to advance the roller longitudinally not to exceed 2 feet in passing from one side of the pavement to the other. The rolling shall be continued until free water ceases to come to the surface, but all portions of the concrete surface shall receive at least three rollings.

42. *Belting*.—After the rolling has been completed the concrete shall be finished by using a belt made of canvas or rubber belting not less than 12 inches in width nor less than 2 feet longer than the width of the pavement. When required or approved by the engineer other methods of surface finishing shall be used.

43. *Protection of concrete*.—On the next day after the pavement has been laid the surface shall be covered with 2 inches of earth which shall be kept wet for a period of not less than 18 days under the most favorable conditions, the period to be stipulated by the engineer, during which time traffic shall be excluded from the pavement by the erection and maintenance of suitable barricades. After the foregoing period has elapsed, the covering on the concrete shall be removed, the surface of the pavement swept clean, after which the roadway may be opened to traffic. When required or approved, other methods of curing or protecting the concrete may be used.

44. *Freezing weather.*—Concrete shall not be mixed or placed when the temperature is below 35° F. In freezing weather the surface must be protected from frost at least 10 days from the time of laying. If the pavement becomes appreciably damaged by frost, it shall be replaced at the contractor's expense upon written notice of the engineer.

45. *General protection of work.*—All cement work is to be kept moist, protected against the weather and guarded against travel until it has set. Care shall be taken at all times not to interfere with business or travel more than is absolutely necessary for faithful execution of the work. The contractor will not be allowed to occupy the streets by material more than is absolutely necessary for the prosecution of the work. The contractor will be held responsible for all injury done to the work in any way until it has been accepted and measured by the engineer.

46. *Plumbing.*—All preliminary plumbing work will be done by the District. The contractor will be held responsible for any damage or obstruction to plumbing appurtenances due to his work.

47. *Cleaning work.*—Before acceptance of the work it will be cleaned and all débris and unused material removed. No crumbling or uneven edges of the cement work will be allowed to remain.

48. *Additional work.*—Contractors must do such additional work incident to the construction of new pavements as may be ordered on each street by the engineer commissioner. Such work shall be in accordance with current District specifications. Prices paid for this work will be as stated below:

- (a) Removing old curb, including haul not to exceed 2 miles, 15 cents per linear foot.
- (b) Hauling same beyond distance to nearest property yard, 1½ cents per linear foot per mile.
- (c) Removing old rubble, cobble, granite block, flagging stone, brick, asphalt block, vitrified block, etc., including haul of not over one-fourth mile, 15 cents per square yard.
- (d) Hauling same to or from place of deposit when more than one-fourth mile from the work, for rubble, cobble, flagging, and brick, 2½ cents per square yard for each additional one-fourth mile or fraction thereof.
- (e) Removing old concrete base and hauling not over 1,000 feet, \$2.60 per cubic yard.
- (f) Hauling excavated material per 100 feet over an average distance of 1,000 feet, 1½ cents per cubic yard.
- (g) Resetting 6-inch by 20-inch curb, 40 cents per linear foot.
- (h) Resetting 8-inch by 8-inch curb on old base, 25 cents per linear foot.
- (i) Resetting 8-inch by 8-inch curb on new concrete base, 50 cents per linear foot.
- (j) Adjusting manhole tops and basin covers to grade, \$2 each.
- (k) Adjusting water valve casings to grade, \$4 each.
- (l) Dressing, jointing, and cutting curb, etc. (stonecutter's time), including setting-up labor, \$1 per hour.
- (m) Relaying brick walks, 40 cents per square yard.
- (n) Saving stone, boulders, or cobble, etc., of acceptable quality, 80 cents per cubic yard.
- (o) Portland cement concrete base (proportions 1:3:6), \$8 per cubic yard.
- (p) Relaying cement walks, \$2.50 per square yard.
- (q) Cleaning vitrified block and granite block for relaying, 45 cents per square yard.

49. *Extra work.*—The contractor must be prepared to do any extra work that may be ordered in writing by the engineer arising out of any modification of these specifications that may appear necessary, and for this he will be paid at current contract rates for work of similar character; or, if the extra work should be of a class for which no rate is fixed by current contracts, the actual reasonable cost to the contractor as determined by the engineer, plus 15 per cent. The contractor shall have no claim for compensation for extra work unless the same is ordered in writing by the engineer. All additional and extra work shall conform to current District of Columbia specifications therefor.

50. *Bids.*—The contractor will, for the prices bid, do all the work prescribed in these specifications; provide bridges, fences, and other means of maintaining

travel on intersecting streets, roads, and railroads, and all private driveways, after giving due notice to parties affected thereby; maintain the same in good and safe condition as long as may be necessary and then remove such temporary expedients and restore such roads to their proper condition; provide watchmen, red lights, fences, and other precautionary measures necessary to the protection of persons and property; furnish all materials, and all tools and implements, labor and transportation required to execute the work covered by these specifications and do each and all of these to the satisfaction of the engineer. Any damage done by him in connection with his operations hereunder to public roads or streets or other public works or appurtenances must be repaired by him or at his cost.

GENERAL STIPULATIONS.

These stipulations are part of the specifications.

1. *Bond.*—Good and sufficient bond in the penal sum equal to 25 per cent of the estimated amount of the contract, with sureties or a surety company satisfactory to the commissioners, will be required from all contractors, guaranteeing that their contract will be faithfully performed; that the contractor or contractors will be responsible for all claims for damages to persons, property, or premises arising out of his or their operations prior to the acceptance of the finished work, and that he or they will promptly make payments to all persons supplying him or them with labor and materials in the prosecution of the work provided for in the contract. In the event that the sureties or surety company become unsatisfactory to the said commissioners, they may, in their discretion, require from the contractor an additional or new bond, in the same or a lesser penal sum, with sureties or a surety company satisfactory to them and to be conditioned as above required.

Upon the failure to furnish such additional or new bond within 30 days after written notice so to do, all payments under this contract will be withheld until such additional or new bond is furnished.

2. *Transfers.*—No contract or any interest therein shall be transferred by the parties to whom the award is made; such transfers will be null and void, and will cause the contract to be annulled and the work to be given to other parties under the conditions mentioned herein.

3. *Patents.*—The District of Columbia assumes all responsibility under this specification and contract as to any claim which may be made that any process prescribed in these specifications is an infringement of any patent covering pavement construction and will defend and save harmless the contractor as to any such claim or the defense thereof in the courts: *Provided, however,* That the District of Columbia shall not be liable for claims for damages or anticipated profits preferred by the contractor on account of delay, interruption, or abandonment of the work occasioned by or resulting from such action of infringement as is above referred to. The contractor, however, will be required to hold the District of Columbia harmless against all or any claims for the use of any patented article, appliance, or process in connection with the contract herein contemplated, except as related above.

4. *Contractor's risk.*—All loss or damage due to negligence, or arising out of the nature of the work to be done, or from any unforeseen or unusual obstruction or difficulties which may be encountered in the prosecution of the same, or from the action of the elements, will be sustained by the contractor.

5. *Employees.*—The contractor shall employ capable superintendents or foremen to represent him on the work, and they shall receive and obey orders from the engineer. He shall so conduct his operations as to interfere with the work of other District contractors as little as possible. The foreman, mechanics, and others employed by the contractor shall be skilled in the several parts which are given to them.

An employee or agent of the contractor who shall use profane or abusive language to the inspector, or otherwise impede or embarrass him in the performance of his duty, or who, in the opinion of the engineer, is careless or incompetent, or obstructs the progress of the work, or disobeys or evades the instructions given by the engineer, shall be immediately discharged and not again employed without the consent of the engineer.

6. *Weather.*—The contractor shall suspend all work under the contract when notified by the engineer that the weather is unsuitable for carrying it on.

If the work is allowed during cold or freezing weather, the contractor shall take such additional precautions as the engineer shall require, without additional expense, and under no circumstances shall materials be used which have been injured by the weather.

7. *Inspection.*—Inspectors may be appointed who shall have access to all parts of the work at all times and whose duty it shall be to point out to the contractor any neglect or disregard of the specifications of the contract; but the right of final rejection of the work will not be waived at any time. Upon all technical questions concerning the execution of the work, in accordance with the specifications and the measurements thereof, the decision of the engineer shall be final. Ordinarily, one inspector will be employed by the District of Columbia for each section of the work under contract; but if, on account of any apparent disregard of the specifications, additional inspectors shall be required, they will be employed by the District of Columbia, at the rate of not to exceed \$4.50 per diem each, and the cost of the same will be charged to the contractor and deducted from any moneys due or that may become due to the contractor.

8. *Condemned work.*—All materials furnished and work done not in accordance with these specifications shall be removed within 24 hours after written notice from the engineer, by and at the expense of the contractor; or, in case of failure to do so, it shall be removed by the District of Columbia and the cost thereof charged to the contractor and deducted from the amount due or which may become due him. None but the best material of the several descriptions shall be used.

9. *District material.*—No materials furnished by the District shall be applied to any other use, public or private, than that for which they are issued to the contractor. The contractor will be held responsible for all materials delivered to him upon requisition, and shall be charged for all materials delivered upon said requisition. Should the amount of materials actually delivered and not properly accounted for exceed the amount used upon the work, the cost to the District of the difference must be made good by the contractor, and will be deducted from any moneys which may be due him.

Any material that is the property of the District that is not accounted for by the contractor to the satisfaction of the engineer will be charged against the contractor at the contract price for similar material.

10. *Failure.*—If the contractor shall delay or fail to commence with the delivery of the material or the performance of the work as specified herein, or shall, in the judgment of the Commissioners of the District of Columbia, fail to prosecute faithfully and diligently the work in accordance with the specifications and requirements of this contract, then, in either case, the said commissioners shall have the power to annul this contract by giving notice in writing to that effect to the contractor, and upon the giving of such notice all payments to the contractor under this contract shall cease, and all money or reserved percentage due or to become due thereunder shall be retained by the said commissioners until the final completion and acceptance of the work herein stipulated to be done; and the said commissioners shall have the right to recover from the contractor whatever sums may be expended by the District of Columbia in completing the said contract in excess of the price herein stipulated to be paid the contractor for completing the same, and also all costs of inspection and superintendence, including all necessary traveling expenses connected therewith, incurred by the said District of Columbia, in excess of those payable by the said District of Columbia during the period herein allowed for the completion of the contract by the contractor; and the said commissioners may deduct all the above-mentioned sums out of or from the money or reserved percentage retained as aforesaid; and upon the giving of the said notice the said commissioners shall be authorized to proceed to secure the performance of the work or delivery of the materials, by contract or otherwise, in accordance with law.

11. *Payments.*—Payments will be made monthly, provided the progress of the work is satisfactory, less 10 per cent of each estimate, to be withheld until final payment.

12. *Conveniences.*—The contractor shall provide, for use of the District inspectors, stationed at paving plant, and cement warehouse, suitable office and testing room with such plain furniture as may be necessary for the proper transaction of their business as agents for the District. They shall also furnish,

when needed for use of laborers on line of work, necessary toilet conveniences secluded from public observation.

13. *Cleaning up.*—On the completion of work it shall be thoroughly cleaned up before it will be accepted.

14. *Lines.*—All necessary lines and levels will be given by the engineer by means of suitable marks, and in establishing them the contractor shall provide such materials and assistance as may be required by the engineer. All marks given are to be carefully preserved and if destroyed through carelessness the cost of replacing them shall be charged against the contractor at a fixed price of \$2 for each point, to be deducted from any money found due at final settlement.

15. *Interpretation.*—Any doubt as to the meaning of these specifications will be explained by the engineer, who shall have the right to correct any errors or omissions in them when such correction is necessary for the proper fulfillment of their intention. Whenever the word "commissioners" is used in these specifications, it is understood to designate the Commissioners of the District of Columbia. Whenever the word "engineer" is used, it is understood to designate the Engineer Commissioner of the District of Columbia, or, in his absence, his duly authorized assistants, assistant engineers, and inspectors representing him, limited by the special duties intrusted to them.